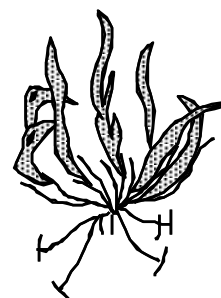
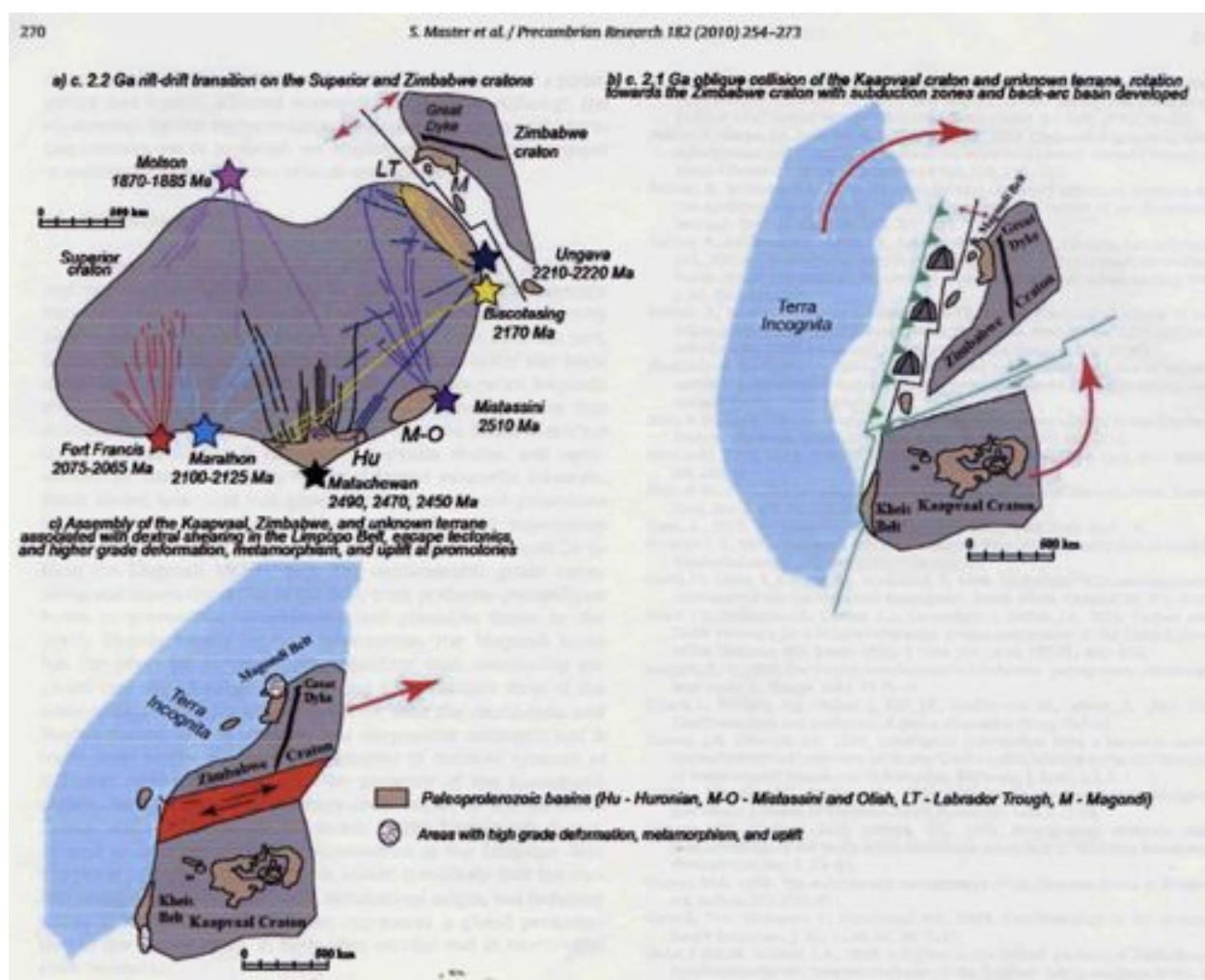


# Geological Society of Zimbabwe 1960 -2010



## Newsletter

June 2011



Tectonic evolution of the Zimbabwe Craton in the early Palaeoproterozoic. (a) Following Söderlund *et al.* (2010), the Zimbabwe craton is positioned along the eastern margin of the Superior Craton at ca. 2.2 Ga. Söderlund *et al.* based their reconstruction on ages and orientation of mafic dykes. Master *et al.*'s (2010) reconstruction is based on sedimentologic and chemostratigraphic similarities between the sedimentary fill of the Labrador Trough and Magondi Belt. (b) Oblique collision between the Kaapvaal Craton and an unknown terrane (*Terra Incognita*) resulted in their rotation, with subduction zones and back-arc basin initiated. (c) Assembly of the Kaapvaal and Zimbabwe cratons, and unknown terrane, *Terra Incognita* at ca. 2.0 Ga led to tectonic escape of the Zimbabwe Craton and dextral shearing in the Limpopo Belt. Irregular shape of colliding cratons with promontories and embayments led to the higher grade of deformation, metamorphism, and uplift in the northern part of the Magondi Belt and southern part of the Kheis Belt.

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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](mailto:marion.debeer@cadline.co.zw)

## Editorial

Welcome to this the first Newsletter under Houda Bouammar's Chairmanship. We welcome her in appreciating that she is the third woman to have taken up leadership of our Society, and we wish her well in her endeavours this year.

Much of this issue is taken up by Part 2 of Keith Viewing's memoirs on aspects of mineral exploration and the development of some ore deposits in Zimbabwe and elsewhere in Africa. We take note of the evolution of exploration methods, successes and failures and take note of the lessons to be learnt from Keith's years of involvement and observation. The wisdom he has to impart should not be overlooked, for much of it is Zimbabwe's heritage.

Aspects relating to our AGM held in February include the minutes of the 2010 AGM, Daniel Chatora's summary for his year of Chairmanship in 2010, the Citation for Sharad Master, Andrey Bekker and Axel Hofmann's Phaup Award winning paper on the Magondi Belt and the Lomagundi Carbon Isotope Excursion and Mr Tusai's citation for Wiseman Chipangamate's excellent project on the Mimosa Mine and for graduating the best geology student at the Zimbabwe School of Mines for 2010.

Our thanks go out to our regular contributors, Maideyi Meck, Bornwell Mupaya and Mitchell Maisera who bring us news of the Geology Department, the Geological Survey and of happenings in the mining industry.

Our news of past and present members is both happy and sad. We record the passing of Dr Clive Stowe who made significant contributions to the advance of Zimbabwe Geology, particularly as a field and structural geologist in his mapping around Shurugwi and in the way he influence so many students who passed through the Geology Department during the 1960s and 1970s. Dr Matthew Armstrong was for a short time Editor at the Geological Survey in the 1990s as part of the BGS involvement with the Department. He died in Edinburgh in April. Arthur Barrie, former Chief Cartographer at the Survey notched up his 80<sup>th</sup> Birthday and Allan Mashingaidze was elected as Second Vice President to the Chamber of Mines at their AGM in May. Makorokoto!

Our greatest Pom Pom, however, is for David Murangari, who was recognized as an Honorary Member of our Society at the AGM dinner in February. Welcome David – we celebrate the contributions you have made to geology and mining in Zimbabwe.



David Murangari – Honorary Member, 2011



## Chairperson's Chat

Houda Bouammar

Greetings to you all.

It is with immense pride that I will be chairing the Executive Committee of the Geological Society of Zimbabwe in 2011. My warm thanks go to the new and old members of the committee and all those members who have joined me in the wonderful journey that 2011 will bring.

I would like to congratulate the 2010 Committee Members and those of our Sub-committee for organizing the October Symposium and in assisting the Geological Survey of Zimbabwe to achieve what was a successful Centenary celebration for the Department.

Also, my warm thanks go to the new members who have accepted to join me in this wonderful journey.

This year we will focus and try to continue the efforts initiated by previous committees in keeping the geological community informed about points of geological interest in Zimbabwe. We will continue to endeavour to organize talks and field trips to interesting sites around the country.

I have no doubt in the active and enthusiastic support I will have from you all.

All the best for this year.

## Articles and Reports

### **A Selection of Mineral Discoveries: Retrospective and in Perspective (Part Two)**

*Keith Alan Viewing*

#### **Silicates of copper and silicates of nickel**

New problems were revealed as the basaltic dykes at Norah and Avondale were too closely related to their copper deposits to be accepted as by chance. The Shackleton Dyke also posed a fundamental problem to enthusiasts for a syngenetic association of copper sulphides in the arenaceous sediments of the Deweras. But these associations were unknown when Kenilworth Farm was prospected.

At Kenilworth Deweras Lava (or was it a sill?) capped the Arkose and the soil traverses reflected, as expected, high contents of copper over the basalt and low levels over the arkose. The dips were intermediate and some contamination by copper in the basalt-derived soil could be expected.

Both methods of sample attack, strong and weak, confirmed the pattern, but the anomaly was clear only in the hx:cx ratios between them. Chalcopyrite and bornite were disseminated in the arkose to form a horizon almost adjacent to the lava. The barren zone varied from 15 to 25cm thick and the mineralized zone from about 5 to 15m thick, containing about 0.5% Cu. The reason for the narrow strip of barren arkose has remained a mystery, unless due to the temperature gradient of the time.

Each of the important discoveries of nickel in Zimbabwe - Empress, Perseverance, Trojan, Madziwa, Shangani, Epoch and Damba-Silwane, and many prospects - were outlined by blanket soil sampling in their respective reservations. At Shangani and Epoch the soils led to nickel-rich gossan, but that was rare at Damba-Silwane. The gossans at Perseverance and Pikwe in Botswana were obvious at surface, but were leached and had poor signatures.

The exploration problem for nickel was in part understood when you had seen Sudbury, and where was that nickel-serpentine in Manitoba? The background in dunite was taken as 3000 ppm Ni, and where diluted by water as serpentine, about 2200 ppm. For copper, the level was taken as about 80 ppm. So how could you recognize in soils the dispersion from a nickel deposit devoid of copper? The problem was compounded by the preference of nickel in sulphides and serpentine not to disperse, but rather to accumulate as silicates, to about 0.5%, or at occasional sites in the Great Dyke to about 1.4%.

In pyroxenites, the problem was less severe. The Empress nickel-copper deposit, Perseverance and Pikwe-Selibe too, all offered a chance with anomalous copper contents from sulphides far greater than the background of say 200 ppm. But this apparently simple solution to prospecting was seriously negated where the gossan was leached, and at Selibe where the gossan was obscured by calcrete. The geochemical dispersion patterns, in particular at Empress, were not investigated thoroughly until 1963<sup>(17)</sup>, and even then we were back to basics.

The Ni-Cu ratio in mineralized serpentine varied from 12:1 to 15:1, but in the King Mine, there was no copper at all. First, you had to determine the background nickel and copper contents and ratios of the local host rocks. Next, to interpret the soil-anomalies from the ratios and contrasts of these factors; and if that failed, the enthusiasts could try selenium in the vegetation, and test for sulphur bacteria in the soil, or even probe with a wagon-drill.

### **Gossans forever**

Contaminated sites were a problem, even for nickel. Perseverance was found from a copper-drainage anomaly about 20 km in extent. It was too good to be true; the old Bay Horse Mine, where gold occurs with chalcopyrite could be the source, but it was drained by another catchment, and the mineralization was sparse. The Dalny was at the head of the stream, but the gold was in pyrite, accompanied by barren arsenopyrite. Nevertheless, the manager kindly agreed to a tour of the mill (what will geologists want next?), and there was the tub of copper-sulphate, added as a promoter in the flotation cells at a rate of 1.0 t pm.

No stone was left unturned as each anomalous gully from the west bank was tested and the back-wash from flood waters sampled; all were contaminated. Soil traverses covered minor areas of the flood plain where the drainage was not effective, and two were extended over the Perseverance serpentine in 1960, to complete the cover. Just a scoop from the B-horizon, if you could find it, and a few lucky samples from a small, dry run-off gully close by. Even by nickel-silicate standards, the content was high, but the copper was no more than of interest.



Figure 4: The Perseverance gossan



Figure 5: The Perseverance Ni-Cu Mine

Follow-up sampling led to a substantial gossan exposed as a ledge in a shallow gully, fig 4. There was no sign of toxicity or stunted growth, but rather of superb well-grown and shady *Musasa* trees. A borehole was close by and a telephone at the farm had appealed to our leader, but our choice was a good 40 minutes distant. That was fortunate for many years later the old mine buildings were occupied by the Army and several soldiers were poisoned by the combination of nickel, copper, arsenic and sulphates in the water.

The prospecting drives and crosscuts at the 36 m-level revealed a mass of secondary sulphides, and on 72 m, the primary sulphides. The section was not exposed at the time and the absolute depths at which the transitions occurred from leached gossan to active gossan, to secondary sulphides and primary sulphides are not recorded, fig 5.

This discovery had stimulated an extensive programme of exploration in the vicinity by geochemical soil sampling for the metals, and geophysical traverses by I.P and E.M. All of the anomalies included gossans discovered by two vacation-students who simply walked along the strike after the burn-off and before the rains!

Damba, the northern section of the Damba-Silwani nickel deposit was discovered from a gossan that was difficult to discern even in a section of the overburden, about 3 metres deep. This was not impressive, but just a small showing that had to be tested. A banded chert was too far away to be reliable for the dip and strike, but Martin Borman, the geologist, had drilled three shallow, vertical, holes to test the occurrence, and then moved elsewhere. Good thinking; the dip and strike were established at the depths drilled, but another 80-odd inclined holes followed in Damba and Silwane that were selected from IP and EM targets. A subsequent interpretation indicated that all of the inclined holes were directed at 45 degrees, midway between dip and strike, and a new estimate was required of the true thickness and the nickel resource.

#### **'B' stands for many things, even under the sand**

The advantage of sampling at the top of the B soil horizon was simply that iron-oxides

are chemically active and bond metals dispersed in solution. Not many would bother in the routine collection of say 450 samples/day/per sampler, to actually identify, or even reach that horizon when deeper than the elbow. Fortunately, the soil cover in Zimbabwe is commonly residual, shallow, and accessible and the results of the explorations acceptable. But in deep soil cover there are real problems of the Kalahari Sand as a transported overburden that may or may not have become a residual cover according to a subsequent regime of tropical weathering.

The great laterite horizons of West Africa, say 20 m thick, were only 3 to 4 m thick on the Copper-Belt, and almost completely eroded in Zimbabwe<sup>(18)</sup>. Remnants are obvious to travellers near Gweru, but are a surprise when found hidden by the Venus headgear at Arcturus Mine, and amazing when you inspected the unusual and not very competent roof of a huge open stope at the Midwinter! The gold here was contained in limonite pseudomorphs after pyrite crystals that were concentrated in the sheared zones, but the indurated laterite that formed the roof of the surface pillar appeared to be barren, fig 6. In retrospect the leached gossan at Perseverance might have been anticipated for the site was within the old flood terraces of the Mupfuri River. Similarly, the thick, say 4 m of white saprolite at the base of Taba Mali Hill was within the flood plain of the Sebakwe, with felsite in the vicinity. The thick red Kalahari sands above the clean glass sands of Somabula are explained simply as another remnant of intense tropical weathering.

The behaviour of gossan becomes more important where covered by sand, and where included by residual calcrete of subsequent arid environments. These extend through the Northern Cape to Namibia and Botswana and where massive sulphides form prominent expressions as gossan, then these appear stable within calcrete. At Prieska for example, a large outcrop of gossan, say 10 x 5 m in extent is surrounded by thick indurated calcrete, fig.7. Similarly, any chemical dispersion from the gossan is certain to be contained by precipitation at the boundary with calcrete.



Figure 6: Midwinter Mine-gold-rich limonite after pyrite



Figure 7: Prieska gossan surrounded by calcrete

The equally large gossan at the Pikwe nickel-copper deposit was discovered by reconnaissance soil sampling from traverses spaced about 300 metres apart. The terrain was flat, the vegetation sparse, and the soil profile covered by sand that obscured about 6 m of calcrete below. The heroes of the time had removed the doors from the Series II Land Rover; an assistant passed the sample packet to the driver who hung out of the cab, and scooped a sample into the packet whilst on the move! Examination of the discovery site revealed several vehicle tracks and the sample site was disturbed, and churned. Who had directed and pegged the traverse was uncertain, but clearly the team appreciated the metal strip-fastener of the sample packet, a firm scoop and packet, all in one!

The undisturbed soil consisted of fine pale yellow quartz sand, but in places small cone-shaped pillars of sand, only a few millimetres high, supported grains of gossan perched above. The quartz grains were about 80-mesh and the grains of gossan, say plus 30 to minus 45-mesh.

The first bank of shallow diamond drill holes, to about 40 m, had penetrated calcrete for most, if not all, of the depth. The analyses of the cores revealed an uneven spread of copper and nickel through the calcrete with no indication of the source in the bed-rock. The analysis and the sample attack were not at fault for the acid remained active after the digestion of the calcrete. The drill holes were just too shallow.

The discovery site at Selibe was exposed in a trench, in the same elliptical basin of pyroxenite, but about 1.5 km to the south. The vegetation was well established, the terrain flat and covered by a thin blanket of sand. The trench was shallow too, and at depths from 50 to 60 cm, appeared to expose calcrete only. The attitude of prayer, on hands and knees with a x10 hand-lens, was rewarded as always and a narrow zone, about a metre wide was found that contained sparsely dispersed, small (3 to 5mm) grains of gossan. A few of these were distributed close to the surface, and some, or even one or two, had provided the discovery anomaly.

Large samples are always preferred to small, and coarse size-fractions to fine; and gossan as a mechanical dispersion is secure in residual calcrete. But what are the controls to dispersion beneath a calcrete that contains fossil remnants of gasteropods, for example? Pond-life implies standing water, and in that wet environment gossan, if present may weather and the metals be spread over the base of the calcrete pond as the lime precipitates. The extent is unknown unless tested, but in places high background levels for Pb and Zn extend over pans in the Otavi dolomites.

And where silcrete forms the cap rock to calcrete, and seriously inhibits sampling; what then?

### **Where 'All Rooms Face the Sea'.**

'Geology of all of the sciences, appeals most strongly to the imagination'; a deep thought from Hughie Miller who had laboured in a sandstone quarry and took a lively interest in carbonate concretions that contained fossil fish of the Old Red Sandstone<sup>(19)</sup>. Another facet of the imagination was tested upon the Queen's Birthday 1956, when a cross-cut converted to an underground dam was waded to chest level and found cold underfoot, and under-belly. The carbide-lamp spluttered and this was no place for a flame-out!



The purpose was to find a section through the ancient volcanics and sediments that included steep but narrow bands of BIF. Our man had written that these would be revealed as massive pillars of iron-pyrite cut by the Kanyemba Reef, and mineralized as a result. The pyrite was needed to provide sulphur and acid for the proposed phosphate-fertiliser industry to serve the region, and the farmers had agreed to use a local product mined from our own deposits at Dorowa. Alas, there was no pyrite in the BIF, but to follow the imaginative process and to establish the source of the sulphur, a pit was sunk into the footwall of the reef underground that exposed a selvage of pyrite about 20 cm thick. The hanging-wall contact was barren; pity. No holiday for some on that day, but our manager explained that we had an option for six-months anyway; 'Back you go and find some gold'. It was only recently that the superb map and text by F.E. Keep was found in an old Bulletin of the Survey, 1928-30, long out of print. That would have saved a significant expense fifty- five years ago.

Imagination was just as important to our prospectors, brought up in the tough school of the Depression in 1930 and many had preferred to take a pan into the bush rather than work on the strip roads of the time. The golden-egg on one occasion now lies deep in the waters of Lake Kariba, but the old maps record a couple of mud huts under the name of 'Trooper Hunts'. We had left at half-light to walk down a dry river bed and find, mid-morning, a narrow, say 35 cm-wide horizon of gypsum in the river-cliff with a shallow dip. The next outcrop was found at noon about 4 hours walk to the west in that dry and barren country. The gypsum here was about 20 cm thick. If you needed gypsum for plaster, there it was, and as the enthusiast said, 'It was bound to join up underneath'. The heat and the disappointment were too much for my aged friend, but after an hour or two under a huge boulder in a river bed, and plastered with damp sand, he revived and we made it to Trooper Hunts again.

The legends are endless; and wherever prospectors gather the wisdom is passed around as one tale stimulates another. Termite prospecting was in vogue and friends at the Geological Survey had commented that termites were probably more thirsty for water than hungry for gold as they built their nests on the fringe of the Kalahari in Lower Gweru. Luck held for Bill West, as always, and there was the quartz vein 35 metres under the termite mound surrounded by sand. Gold was visible in a substantial quartz vein exposed by the cross-cut and Termite Prospecting was proved! Later, a zone of crushed gold-bearing quartz was found buried in the sand, about 25 cm beneath the surface, grind stone and all. The sand cover here was accumulated from sheet-wash down slope. And the termites were in the drive below enthusiastic in their search for water and clay in the weathered wall to the reef, fig 8.

The luck held at the White Ant shaft also. The termite mounds were anomalous and Jimmy Cunliffe's shaft soon exposed a solid reef with silver and zinc at 8 metres, but covered by 3 m of Kalahari over the weathered rock. Did the termites sample the reef? Or better still, had they an appetite for the silt and clay represented in the B-horizon at a metre below the surface?



*Figure 8: TheTermite Mine  
35 m-level. Sid West and termite tubes*

But one of the best stories from the old Umsweswe Hotel was of a search for copper-lead-zinc deposits in Ireland. They had worked for two months, testing each of the drainages without success. A corrugated iron hut at the lake served as a laboratory that was certain to be heavily contaminated by zinc. A nightmare, but Rosie, a ten year old, was the cheerful and willing technical assistant who made the difference! On that very last day of two months search in the field, and in that very last stream, the total-heavy-metal result was rich and bright pink in the test tube, glinting in the sun. This was magic, success at last, until a dry-stone wall was crossed to find an ancient track covered by coal-ash and cinder! More samples were tested up-stream and the anomaly held! But there was a field of potatoes that extended to the bank, and there, even as they watched, came a horse and cart with a great barrel, stained bright green by copper sulphate.

No stone should ever be left unturned. They watched the farmer spray the potatoes, watched as he re-filled with more copper and more water from the spring at the head of the stream. They wondered at the great swell of the Devonian dome that rose on the skyline beyond the derelict farm house. This was a perfect site; this was the place! Our man had stripped to the waist on that cold and raw day; his friend held an arm as the other reached deep into the free-flowing spring, test tube in hand to sample the waters. Yes! Even where the banks were littered with copper sulphate crystals and the entire stream contaminated, the underground waters were metal-rich. Another mineral deposit was discovered!

### **Where is the where is? It is where it is!**

Almost invariably the talk at the Umsweswe turned to gold and the litany of discoveries, the success of some but punctuated by silences so profound that you wondered whether the hero of the tale had survived on the 'whiff of an oil rag', or simply gone under.

There were said to be some 4000 gold discoveries on outcrop and 100,000 claims at the start with only the Eldorado in production at Lomagundi. By 1947 there were 1447 mines and almost all were quartz reefs except for the Sherwood Starr and the How. The mineralized sheared zones of Bindura's Botha-Promoter and Phoenix Prince, the

Jethro in Gwanda and Turk at Queen's were probably too low a grade at the time. Only the Shamva was entirely free-gold and for all of the others about 30% or more of the gold was in a sulphide phase.

How many of these quartz reefs were associated with gold dispersed in sulphides hidden in deeply weathered sheared-zones, regional or local? What was under those huge expanses of maize-lands, all coloured green on the geological maps, farther along the Mazowe, and at Norton, Chegutu, Chakari and Kadoma? There were a hundred old shafts around the Cam & Motor, and did the Eileen Allannah really have potential or was that another beneficiary too? Just look at all of those old shafts (was it nine?) that were connected underground to become the Dalny, the largest producer of the day. That sheared zone extended from the Bay Horse to the Thame, about 25 km, and then to the Jena Group and so to Bulawayo, the Motapa *et al.*

The ideas were not new, loaming for gold was tried and tested, even sampling deep overburden by tractor-powered post-auger drills around the Lion Hill Stock (Golden Valley), under the Scheme. But what about non-assayable gold, and paint gold? How did gold concentrate in mopani props in flooded workings, and in maize stalks too?

Not much was found in the literature but a battered copy of Lindgren (1919) explained that gold was soluble by chloride in the presence of manganese, and plenty of those elements in mafic volcanic rocks. The analysts laughed at the idea of humic acid (whatever that was), as a solvent for gold in the tropical rainforest of Brazil, but were silent when the BRGM had reported a gold-bearing laterite in Senegal in about 1958. And the search was renewed again as vat-leaching gave way to heap-leaching by direct cyanide. And bacteria made their contribution, provided they could be kept alive.

The gold pan was the exploration tool of the time with loam samples of about 5 kg, but beware of transport on corrugated roads of more than 10 km and the inherent error of the Riffle Splitter, and infinitely worse, the preference by some for 'rolling and quartering'.

Amazing! Not every field hand was a natural at panning gold and our energy intensive technique was nonsense as compared to the gentle and very effective wave action preferred by our friends in Tanzania. It was a disaster, but quality control was achieved by a few grains of copper filings in each pan as a tracer, and if that very visible metal was recovered there was every chance that gold would be retained.

The problem was discussed at the Royal School of Mines. The analysts recommended cyanide, but who could suggest how and where that was to be done with hundreds of students and staff all terrified of a miserable end, and insufficient space for those affected in the Albert Hall nearby?

The cyanide process was Australasian, and once again they led the way. Thirty years later in Zimbabwe it was via Canadian Aid in the Midlands that provided the stimulus. Thousands of arsenic analyses had failed as a pathfinder, but soon we had the outline of a method and at the University of Zimbabwe the staff and students were by far more sensible. The orientation studies and the quality control techniques all inspired confidence, but there were no rumours of success from the results. Samples each of 500 g were analysed at a rate of 4500 per month.

The search was renewed and in retrospect it was the Kanyemba again that appeared to hold the key. Large zones of the mafic lavas were characterized by the alteration of ilmenite to leucoxene, but the reef cut both zones indiscriminately and there was no direct connection within the pattern of the drill holes. About thirty years later, Sid West at Jena had produced a drill core (X-Ray), from somewhere on the Leopardess. A mineralized quartz vein, about 9 mm thick was wedged between wall rocks of mafic lava, intensely altered to sericite with leucoxene as a progressive replacement of ilmenite for a metre on both walls!

Perhaps Warwick Bailey, as Manager of the Muriel was right to insist on regular cross-cuts into the footwall as one lode-like ore shoot followed another, along strike and down dip. He had understood the regular nature of the structures, probably in the same way as W.D. Fair led his reluctant miners to the discovery of the Big Bonanza in the mighty Comstock Lode a century before.

### **Into the nowhere**

The second-half century of the Geological Survey was a period of revelation. First, Continental Drift was accepted and it was all about structures and volcanoes ancient and modern. Exodus was real, and the Gemini photographs and deepwater sampling in the Red Sea Rift had proved it. Sedimentary exhalative deposits were for zinc and silver with a manganese halo and these were traced with effect in the Irish deposits. Now there was an explanation for the minerals of the Lomagundi close to the basin margin and beyond. There was some comfort also for the Witwatersrand, the Kafue anticline, and the Katanga.

The years of isolation that led to Independence were another mystery. A granite in the Archaean of Ontario was reported as a Porphyry Copper and Mtuga in Zambia was another, and the Lion at Chishanya too. What was in our granitic terrain? Some answers came from the lithium trend and gold prospects of the Chinamora, but the age determinations in the core did not suit the gurus and as is common with new knowledge, these were simply not believed! The Italians, more used to Plutonism, took an interest in molybdenite and scheelite in the Mutandahwe stock, but the Mateke Igneous Complex seemed to be barren, and the Renco confounded all. The great mass of extrusive and intrusive mafic lavas, and the carbonatites of the Sabi were soon linked to a mantle plume wandering off to Mocambique, and into the ocean. An occasional jolt near Mt. Selinda reminded us that failed rifts are not necessarily stable. About 1968, whispers came of the wonderful discovery at Kidd Creek and the magic triangle of Noranda, Porcupine and Kirkland Lake, all rich in gold, silver and copper and all directly associated with vents in the Archaean. By 1971 the focus and the tools in Zimbabwe had moved to the iron-formations, back to the (Mazowe) Iron Duke and on to Vubuchickwe. The hope was that these might mirror volcanic plugs in the footwall, rich beyond belief. We had pounded away for twenty years and then the paths returned to the Iron Duke, the Skipper and Copper Emperor, and even the tiny Tripod.

And then came the newest of catchwords, 'VMS', breathless and in a whisper from our leader in touch, in 1993, with modern thinking from foreign parts. (What on earth was that?) 'Did these exist in Zimbabwe at all?' The answer was remembered much too late to impress; it was a pers.com. from Smiling Al at the departure gate; The Guru of Gold '82. The Elliot Lake-Chibougamau Greenstone Belt was the host to all of these famous deposits, about 650 km on strike and about 175 km wide. By contrast the

mafic volcanics of the Gold Belts of Zimbabwe were too small to generate substantial deposits of metals from the great boiling pot below.

The Carlin Trend had escaped us too, but you could explore the Piriwiri Mineral Belt of the Lomagundi, nicely mapped and described by A.J.C. Molyneux in the Geological Survey Bulletin No 6, of 1919. And the ideas moved on to whatever might be found in the deep structures of the Chimanimani, but never easy to recommend exploration in a National Park, using the Rest Camps as a base.

The Geological Survey of Zimbabwe was seldom above criticism. For example the Survey was always besieged by those who needed a gold mine or, as the Minister had recommended when gold was down, a base metal deposit, or even an industrial mineral. Only 'a solid hill of it' would do. But enthusiasms come and go, from gold to base metals, to tin, tantalite, scheelite and the lithium minerals; on to diamonds, then kyanite, back to platinum, again to uranium, on to oil in the Valley, underground gasification of coal, coal-bed methane, return to diamonds, and gold is for the hungry and where you find it.

But what about the granite? What was the Survey doing about the granite? The visitor was a sensible looking fellow, earnest and polite, but not about the Geological Survey. The Minister had recommended his visit, for the people at the University will always welcome new ideas. By contrast, the Survey was stuck in its ways, never did welcome a new approach or a new idea and had not welcomed his; you go to the University!

Well of course, that was our business, research was fascinating, sorting out fact from fiction, new tests to obtain new results, and what did those mean for the common good? We had to agree that not all shared our views, but there was common ground, and what exactly was the problem that had driven him to the Minister?

An atlas was produced, that on some unlikely scale was to demonstrate an entire continent upon a single page. A few rings drawn in pencil held the attention. With a serious mien suited to a great secret, the visitor explained that his friend in the United States was a prospector, skilled with the pendulum, and the penciled rings indicated oil fields!

We agreed that the response from the Survey was a disappointment, even a national tragedy bearing in mind the need for oil. But another coffee stimulates the imagination and he left with the Geological Map of Zimbabwe and instructions to his friend to try again. He returned some weeks later and now the penciled rings could not be denied; these were firm and drawn over the granitic terrain of Mutoko!

A colleague agreed to visit the site with a roll of 1: 50 000-scale maps that illustrated very large penciled rings indeed. Our man returned with the news that the prime target was sited between two huge granite domes, with no sign of oil of any kind. The enthusiast and friend of the Minister was not disappointed. Rather, he was encouraged for our literature search had revealed a drill hole in Sweden that had intersected a pool of oil at a depth of 1.6 km, in granite! Was this derived from some subterranean source of methane?

**We wish you good luck in the Geological Survey for the next one hundred years, and recommend that you should always support a good idea!**

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## MINUTES OF THE 2010 - 28<sup>th</sup> ANNUAL GENERAL MEETING OF THE GEOLOGICAL SOCIETY OF ZIMBABWE

**PRESENT:** Forbes Mugumbate (Chairman), Daniel Chatora (Vice-Chairman), Collins Mwatahwa (Treasurer), Gayle Hanssen (Secretary), Tim & Trish Broderick, Houda Bouammar, Andrew du Toit, Hilary Gumbo, Anne Kritzinger, George Kwenda, Lloyd Chiyamuchiko, Gwendoline Mhasho, Isidro Manuel, Kennedy Mtetwa, Ellah Muchemwa, Bornwell Mupaya, Emmanuel Musimwa, Kudzi Musiwa, Robin Mwaveva, Irvin Nyamukondiwa, Juliet Sheta, Sydney Simango, Ken Stone, Shumba Tanatsiwa, Renias Tirivabaya, Dzingirai Tusai.

**APOLOGIES:** Peter Chadwick, Tyrone Cowland, Benson Bhundu, Peter Bourhill, John Flynn, Julian Green, Solomon Gumbie, Tim Holmes, Garrick Jones, Dai Jones, Jan Kramers, Andy Moore, David Love, Joel Mungoshi, Metrina Mutika, Israel Mvelasi, Leo Passaportis, Anthony Revitt, Roger Tyler, Keith Viewing.

### 1. CONVENING OF MEETING

The meeting was convened at 17.20 by the Secretary, who introduced the Chairman and welcomed the guests of Honour. Apologies submitted to the Secretary by e-mail were read to the meeting. The minutes of the 27<sup>th</sup> AGM held in February 2009 were proposed by Daniel Chatora and seconded by Kudzi Musiwa.

### 2. OBITUARY – PHILIPP OESTERLEN

Tim Broderick gave a detailed presentation on the life of Dr Philipp Oesterlen, including his time in Zimbabwe and his contributions through his work at the Geological Survey of Zimbabwe.

### 3. CHAIRMAN'S REPORT

The Chairman for 2009, Mr Forbes Mugumbate, presented his report as a Power Point presentation and covered the activities of the Society during 2009. This report was published in the GSZ Newsletter of June 2010.

### 4. TREASURER'S STATEMENT

The Treasurer, Mr Collins Mwatahwa, gave the annual financial report for 2009. The Treasurer explained that US\$19,036.78 is held by the Reserve Bank of Zimbabwe (RBZ). This is a result of a Government directive that required banking Institutions to surrender funds from Corporate FCAs (Foreign Currency Accounts) to the RBZ. The Society's Treasurer applied twice in 2009 for this amount to be returned but was unsuccessful on both occasions. However, the Society did open a US Dollar account, and this is where the day-to-day transactions have occurred. In 2009 \$2,523 was obtained from membership subscriptions, with \$1,600 being derived from donations and \$580 from functions held by the Society. During the year the Society paid for 2 guest lecturers to be flown into Zimbabwe. During the year the Platinum companies hosted a field trip and provided the GSZ participants with lunch. The income for 2009 was US\$8,591 with an expenditure of US\$3,067, resulting in a profit of US\$5,524.

Dr Martin queried the bank account structure and whether another bank account should be opened, considering that a large amount was taken. The treasurer replied that the money was taken from the Barclays FCA account. Currently the Society is operating out of a US\$ Barclays account and has some cash in hand. With regards to the opening of an account at another bank, this was considered but rejected. Currently interest rates of 10% were received by the funds held by the RBZ. Dr Martin then proposed the treasurer's report and it was accepted by the meeting.

### 5. ANNOUNCEMENT OF THE 2010 COMMITTEE

F Mugumbate, D Chatora, C Mwatahwa, G Hanssen, H Gumbo, K Musiwa, A du Toit, T Broderick, K Chenjerai, H Bouammar, Simba Chimedza and Anthony Revitt (Bulawayo Representative).

## 6. ANY OTHER BUSINESS

### *Zimbabwe School of Mine – comment by Mr Tusai*

The School is happy to hear about the Certificate of Competency for Geologists and are willing to assist in the creation of this and offer administrative support. Mr Mupaya answered that the Society is looking at the South African standards and will come back to the members on this aspect.

The meeting was closed at 18.50 and followed by the guest speaker, Dr Tony Martin, who gave a talk entitled “*The Wanderings of a Consulting Geologist*”, illustrating his recent global work.

During dinner the Mike Vinyu, Keith Viewing and A.E. Phaup awards were presented.

#### **A.E. Phaup Award:**

*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.

Published in *South African Journal of Geology* in 2009.

#### **Mike Vinyu Award:**

*Best Student, Zimbabwe School of Mines* Lloyd Chiyamuchiko

#### **Keith Viewing Award:**

*Best Presentation at the Summer Symposium November 2009* Hillary Gumbo

The Geoffrey Bond Award for the Best Honours Student at the University was not presented as this course was not held in 2009.

## **Geological Society Activities for 2010: Chairman’s Report at the AGM 25<sup>th</sup> February 2011**

### **1. Introduction:**

Good evening ladies and gentlemen. I welcome you all to this year’s Geological Society of Zimbabwe Annual General Meeting. Special welcome is extended to our guest of honour Mr David Murangari. The year 2010 was an eventful one for your society, but before we go into the details of these activities I would like us first to review objectives which are:

- To promote the science and practice of Geology, and
  - To do all things conducive to the advancement of earth sciences.
- In order to achieve these objectives the Society organizes the following:*
- By holding Society talks; where visiting & local distinguished lecturers/professionals give presentations of their work or research;
  - By holding technical short courses & workshops;
  - By organizing field trips to places of geological interest;
  - By publishing a periodical newsletter;
  - By holding the Summer Symposium;
  - By promoting research in the earth sciences by:-
    - Maintaining a GSZ Research and Development Fund;
    - Presenting the A.E. Phaup Award for the best paper on Zimbabwe Geology published internationally;
    - Organizing the Macgregor Memorial Lecture whereby a distinguished academic or person invited for the purpose;
    - Making the Geoffrey Bond Award for the best B.Sc. Honours degree project;
    - Announcing the Mike Vinyu Award for the best School of Mines’ geology student in the year, and



- Nominating the Keith Viewing Award for the best presentation at the Summer Symposium.
- Promoting the teaching of earth sciences through the:-
  - Geology Lecture Fund, which is promoted with assistance from the Mining Industry;
  - Financial support of a B.Sc. Hons. Geology student.
- Hosting International Conferences & Field Trips, most recently to celebrate the Centenary of the Zimbabwe Geological Survey.

This evening we will have presentations for the Phaup and the Mike Vinyu Awards.

## 2. The 2010 Committee:

The table shows the Society's executive committee members for 2010, and their duties.

| NAME                   | PORTFOLIO                               | ORGANIZATION                       |
|------------------------|---|------------------------------------|
| CHATORA, Daniel (Mr)   | Chairman                                | Metallon Gold Zimbabwe             |
| BOUAMMAR, Houda (Dr)   | Vice-Chairperson / Website              | African Consolidated Resources PLC |
| MUSIWA, Kudzai (Mr)    | Secretary / Certification of Geologists | University of Zimbabwe             |
| MWATAHWA, Collins (Mr) | Hon. Treasurer / Membership Secretary   | Anglo Platinum                     |
| BRODERICK, Tim (Mr)    | Newsletter                              | Jeremy Prince & Associates         |
| DU TOIT, Andrew (Mr)   | Summer Symposium (Conference)           | Zimbabwe Platinum Mines            |
| MUGUMBATE, Forbes (Mr) | Phaup Award Committee                   | Geological Survey of Zimbabwe      |
| GUMBO, Hillary (Mr)    | Field trips                             | H.N. Gumbo & Associates            |
| HANSEN, Gayle (Ms)     | Talks                                   | Digital Mining Services            |
| CHIMEDZA, Simba (Mr)   | Field trips                             | GAT Investments                    |
| REVITT, Anthony (Mr)   | Bulawayo Representative                 | Anthony Revitt Consultants         |

## 3. Society Talks:

We had 3 world-class presentations this year as follows:

- On the 3<sup>rd</sup> (Harare) and 17<sup>th</sup> (Bulawayo) May Dr. Eric Roberts of Southern Utah University presented a talk entitled "*Reconstructing Early Jurassic Through Early Cretaceous Paleoclimates & Paleo-environments in Central Africa*".
- On the 14<sup>th</sup> May; Professor Paul Dirks, now of James Cooke University in Townesville, made a presentation to a packed Art Corporation Auditorium, titled "*The Discovery of a New Species of Hominid Found Near Johannesburg in August 2009*"
- Then on the 16<sup>th</sup> June; Zee Bhebhe presentation his experiences in exploration in the DRC in a talk entitled "*Kimberlite Exploration in the DRC*".

## 4. Field trips:

The Society was provided with an opportunity for a field trip when we were invited to join Professor Allan Wilson and his Wits University Geology Honours Class on a day visit to the North Dyke Chrome District on 30<sup>th</sup> May. This was part of the University's Field Excursion to Zimbabwe. The photograph below shows part of the entourage with Professor Wilson:



*Daniel Chatora, February 2011*

## CITATION

For the A.E. Phaup Award for 2010 - ***“A review of the stratigraphy and geological setting of the Palaeoproterozoic Magondi Supergroup, Zimbabwe - Type locality for the Lomagundi Carbon Isotope Excursion.”***

***Precambrian Research, Vol. 182 (2010), pp. 254-273.***

By Sharad Master, Andrey Bekker & Axel Hofmann

The Proterozoic Lomagundi Triad has long presented confusion and even passionate controversy in Zimbabwe geology, intimated as “The Lomagundi Puzzle” by S.H. Haughton’s review in 1969.

From Molyneux’s 1919 pioneering mapping of the area around Chinhoyi, it was the object of successive Directors at the Geological Survey to effect the complete mapping of the Lomagundi extension. These efforts were consolidated in 1973 and presented as a detailed review by Peter Leyshon and Frank Tennick in 1988. They defined the tectonic setting in the Magondi Belt, the evolution of which was reviewed by Peter Treloar in the same year.

Sharad Master was brought up in Johannesburg and gained his Honours degree in Geology from the University of the Witwatersrand. Young Master found it difficult to obtain employment in South Africa, so he applied to MTD Mangula and was flown by company jet to that copper/silver mine within moments of Zimbabwe gaining its Independence in April 1980.

Immediately Sharad applied his enthusiasm and passion to his subject and by 1991 he had gained his PhD on the origins and controls of mineralization at the Mangula and Norah mines, and he had reviewed the stratigraphy, tectonic setting and mineralization of the Magondi Supergroup. By then he was based at the Economic Geology Research Unit at Wits, from where he has continued in his wide research interests.

Therefore, the winning review paper represents a culmination of 30 years of dedication to the subject and a combination of ideas with those of his co-authors.

We have all benefited from Sharad’s enthusiasm, and we welcome the intention for him and his co-authors, Andrey Bekker and Axel Hoffman (who is no stranger) to extend their Zimbabwe research in the field of isotope geochemistry in carbonate rocks in particular.

Encouraged by Gerard Stagman, Schidlowski undertook pioneering carbon isotope work on the Lomagundi dolomites and found extreme enrichment in  $^{13}\text{C}$ , a signature found to characterize other sediments in the 2.2 to 2.0 Ga age bracket in southern Africa and the World. Notwithstanding, the Lomagundi has become the Type Locality for this isotope excursion

shedding light on the oxidation state in deep and shallow-water marine environments and at continental margins.

The cover illustration postulates the tectonic evolution of the Zimbabwe Craton from its apparent relationship with the Superior Craton based on adjacent carbon isotope geochemistry and dyke swarm orientations and ages following the concepts of Soderlund *et al* (including Hofmann), and oblique collision between the Kaapvaal Craton and a *Terra Incognita* with rotation associated with dextral shearing in the Limpopo Belt about 2.0 Ga ago.

We applaud the authors, appreciate their research efforts in Zimbabwe and encourage their continuance for the greater understanding of Zimbabwe Geology. CONGRATULATIONS to SHARAD, ANDREY and AXEL for this recognition. Your hard work is not in vain.

*Tim Broderick, February 2011*

## ZIMBABWE SCHOOL OF MINES

### The Mike Vinyu Award for the best Geological Technician, 2010

Mr Wiseman Chipangamate (25) was born on 8<sup>th</sup> November, 1985. The last born in a family of eight, Wiseman went to Kudzanai and Chirodziv primary schools from 1993 to 1999 and did his secondary education at Nemaikonde High from 2000 to 2005. Here he obtained certificates in poetry writing and for athletics.

At the School of Mines, his project was entitled *Designing of a Diamond Drilling Exploration Program for the proposed Mtshingwe Block at Mimosa Mine*. The objective of the project was to come up with the diamond drilling pattern that will convert the inferred resource in the proposed phase Six expansion area in the Mtshingwe Block into the measured resource category. The second objective was to quantify the number of diamond drill holes with costs required to upgrade the mineral resource in this block. His design came up with 27 proposed drill holes for the project and included a schedule of all activities needed during the diamond drilling program.

Mimosa Mine started its operations in 1994 from an inclined shaft that had been developed in the late 1970's. This project was called *Phase I*. In 1999-2000 a steady state was reached in the *Phase II* operations was reached and the *Phase III* feasibility study was commenced. *Phase III* was commissioned between 2001 and 2003 at a production rate of 120 000 tpm. *Phase IV* was commissioned in 2006 at 150 000 tpm and by 2008 the *Phase V* project was on stream at 175 000 tpm. The latter was an expansion of milling capacity and tailings handling facilities that took advantage of the extra flotation capacity created in *Phase IV*. The *Phase 5.5 Upgrade Project* was commissioned in 2009 at 185 000 tpm. This involved an expansion of crushing and screening capacity, identified as a bottleneck in achieving the full potential of *Phase V*.

During these growth phases at Mimosa it was realized that skilled manpower was required. Management identified young employees with potential and sent them to gain diplomas in geology, mining, survey and metallurgy at the Zimbabwe School of Mines. Wiseman, one of the beneficiaries of this sponsorship, had joined Mimosa Mine as a conveyor belt attendant in February 2007. He was promoted to the position of geology sampler towards the end of 2007. His potential was appreciated and he was sent to study for a National Diploma in Mining Geology at the School of Mines during 2009 and 2010, starting the second year course straight from industry. By the conclusion of the course in November 2010 Wiseman had been adjudged the best student in Geology and overall, the School's outstanding student for 2010. He gained 11 distinctions and 2 credits, including a first class distinction with his project. He is the best student that the School has had for the past three academic years.

I would like to express my sincere gratitude to Wiseman's lecturers for the guidance that they provided him and than all those who worked with him during his learner-ship and training, both in the classroom and in the field. A great thank you goes to his mentors in the Mimosa Platinum Mine's Training Department (Technical Training Section) who afforded Wiseman the chance to train as a Geological Technician. These include Mr P. Chimboza (Resident Director), who sanctioned the sponsorship, Mr G. Tizirai, Training and Development Manager, Mr Mapundu, Geology and Survey Manager, Mr A. Mudzovaniswa, Geology Manager Operations, Mr P. Chitsiku, Mineral Resource Evaluation Manager, and all geologists at Mimosa Mine.

*D. Tusai* – Chief Executive Officer, Zimbabwe School of Mines, Bulawayo – February, 2011

## News



### Geology Department, University of Zimbabwe

*Maideyi Meck*

It is disappointing to report that the Department is still struggling and may be finally breathing its last. The Department did not take in students in August 2010, and with current staff levels we cannot take another stream in August 2011. We are still trying to recruit graduate teaching assistants who will register for M. Phil. degrees and then help in teaching. As of now the Department has recruited two new teaching assistants, Mr Pardon Kanyezi and Mr Victor Owen. If we manage to recruit at least three more we can take in another stream of students starting in August. The salaries and working conditions at the University of Zimbabwe have improved greatly such that those who need to further their education can do so. Research funds are also slowly but surely becoming available.

The Department is proposing to move from the BSc General degree to a BSc Honours degree, which can be run in modules whereby lecturers from other universities can be brought in to assist. Any suggestion on what to include in the course content for the proposed new BSc Honours in Geology is most welcome.

The Part II field trip to Chinhoyi will be held from the 11<sup>th</sup> to the 20<sup>th</sup> June. The University and the students will share the costs of the trip. In the same vein the Department is making an appeal to industry for donations in cash or kind (food, fuel and manpower) to make our essential field trips a success.

#### Contact details:

| Name                | Position         | Other      | Email  | Cell        |
|---------------------|------------------|------------|--|-------------|
| Mrs L. Meck         | Chairperson      |            | <a href="mailto:mabvira@science.uz.ac.zw">mabvira@science.uz.ac.zw</a>       | 0772-906612 |
| Prof. I. Manuel     |                  |            | <a href="mailto:isrvn@yahoo.com">isrvn@yahoo.com</a>                         |             |
| Mr D. Maguze        | Chief Technician |            | <a href="mailto:dmaguze@science.uz.ac.zw">dmaguze@science.uz.ac.zw</a>       | 0712-639792 |
| Mrs G. Chipari      | Secretary, DG    |            | <a href="mailto:gchipari@science.uz.ac.zw">gchipari@science.uz.ac.zw</a>     | 0772-950681 |
| Ms N. Musundire     | Secretary, MRC   |            | <a href="mailto:nmusundire@science.uz.ac.zw">nmusundire@science.uz.ac.zw</a> | 0712-436649 |
| Ms. H. Bouammar     | Chairperson, GSZ |            | <a href="mailto:hbouamar@hotmail.com">hbouamar@hotmail.com</a>               | 0776-127004 |
| Mr. K. Musiwa       | GSZ Committee    | Mining, UZ | <a href="mailto:kudzic@eng.uz.ac.zw">kudzic@eng.uz.ac.zw</a>                 | 0772-948915 |
| DG Direct line/Fax: | 263-4-303557     |            |  |             |

**Note:** DG – Department of Geology; MRC – Mineral Resources Centre; GSZ – Geological Society of Zimbabwe

# Geological Survey Department



**ZIMBABWE**

## 1. INTRODUCTION

The year started on a poor note in that very little money was released for real geological work. As a result of budgetary constraints, much of the work was office-bound in collating and synthesizing existing data.

Senior management attended several mining meetings, including on the possibility of cooperation being established between the Zimbabwe Geological Survey and the Council of Geosciences of South Africa (CGS). The two organizations will enter into a MOU to cooperate in various fields including training individuals in geological field mapping. Currently, the Zimbabwe Geological Survey lacks capacity to carry out geological mapping whereas the CGS has established a training school for the purpose. A delegation from Japan Oil, Gas and National Cooperation (OGMEC) based in Botswana made a follow up on the MOU between the two countries ahead of the training of 5 Zimbabwean geologists in remote sensing techniques. The draft MOU is at the Ministry of Foreign Affairs.

## 2. STAFFING MATTERS

### Staff Establishment as at 31 April 2011

There has been no improvement in the staffing situation at the Department, which is still at only about 40% capacity as tabled below. With no graduates coming from the local university, suitably qualified geologists are only expected to apply from universities in neighbouring countries.

| Post   | Incumbent    | No. Post | Filled Posts | Vac. |
|--|--------------|----------|--------------|------|
| <b>Director</b>  | Hawadi M.T.  | 1        | 1            | 0    |
| <b>Deputy Director</b>   | Mugumbate F. | 1        | 1            | 0    |
| <b>Regional Geologist</b>  | Mupaya F.B.  | 3        | 1            | 2    |
| <b>Chief IT Geologist /<br/>Geophysicist Data<br/>Management</b> | Mukandi M.A. | 1        | 1            | 0    |
| <b>Chief Econ. Geologist</b>                                     | -            | 1        | 0            | 1    |
| <b>Chief Field Geologist</b>                                     | -            | 1        | 0            | 1    |
| <b>Chief Geophysicist</b>  |              | 1        | 0            | 1    |
| <b>Geologist/ Snr /</b>  | Lunga S.     | 26       | 7            | 19   |

|  |   |   |   |   |
|--|---|---|---|---|
| <b>Principal</b>   | Mugandani E.T.<br>Mpindiwa S.<br>Muzanenhamo F.<br>Kashiri T.<br>Mangezi M.<br>Maisera M. |   |   |   |
| <b>Geological Cadets</b>                                       | -   | 4 | 0 | 4 |
| <b>Geophysicist /Snr/ Princ.</b>                               | Shawarira L.<br>Ndoro M.M.  | 5 | 2 | 3 |
| <b>IT Geoscientist / Snr/<br/>Princ. (Data<br/>Management)</b> | -   | 2 | 0 | 2 |
| <b>Chief Cartographer</b>                                      | Sithole R.T.  | 1 | 1 | 0 |
| <b>Assistant Chief<br/>Cartographer</b>                        | Mudzi A.  | 1 | 1 | 0 |
| <b>Higher Tech/Snr/ Princ.</b>                                 | Chimuka N.<br>Chibove L.<br>Matsatswa M.  | 6 | 3 | 3 |
| <b>Geophys Tech/<br/>Higher/Princ</b>                          | -   | 3 | 0 | 3 |
| <b>Geol Tech/ Higher/Princ.</b>                                | -   | 3 | 0 | 3 |
| <b>IT Technician</b>   | Munhapa M.  | 2 | 1 | 1 |
| <b>Librarian</b>   | Tavengwa N.   | 2 | 1 | 1 |
| <b>Assist Librarian</b>  | Mandikutse F.   | 4 | 1 | 3 |
| <b>Admin Officer</b>   | Ndlovu S.   | 1 | 1 | 0 |
| <b>Human Resources<br/>Officer</b>                             | Mazingaizo C.   | 1 | 1 | 0 |
| <b>Snr Exec. Assistant</b>                                     | Shoniwa E.  | 1 | 1 | 0 |
| <b>Exec. Assistant</b>   | Ndawi M.  | 5 | 1 | 4 |
| <b>Acc. Assist.</b>  | Machengete G.F.   | 1 | 1 | 0 |
| <b>HR Assist</b>   | Murwira T.  | 1 | 1 | 0 |
| <b>Admin Assist</b>  | Chavunduka C.   | 1 | 1 | 0 |
| <b>Records &amp; Info</b>                                      | Mazanhi W.  | 1 | 1 | 0 |
| <b>Lab Technician</b>  | -   | 1 | 0 | 1 |
| <b>Lab. Assistant</b>  | -   | 2 | 0 | 2 |
| <b>Driver</b>  | Makamure W.   | 1 | 1 | 0 |
| <b>Snr Darkroom</b>  | Kazingizi N.  | 1 | 1 | 0 |

|                       |                                       |            |           |           |
|-----------------------|---------------------------------------|------------|-----------|-----------|
| <b>Operative</b>      |                                       |            |           |           |
| <b>Field Orderly</b>  | Urombo D.<br>Ntini S.<br>Sikhosana D. | 8          | 3         | 5         |
| <b>Office Orderly</b> | Mbofana R.<br>Mushongavhudzi<br>L.    | 3          | 2         | 1         |
| <b>General Hand</b>   | -                                     | 1          | 0         | 1         |
| <b>Commissionaire</b> | -                                     | 3          | 0         | 3         |
| <b>Total</b>          |                                       | <b>100</b> | <b>37</b> | <b>63</b> |

### Resignations

The Department announces the retirement of **Mr Dennis Bob**, Senior Laboratory Assistant, from the Public Service with effect from 31 January 2011. He joined the Geological Survey in 1973. We wish him all the best in his retirement.

### Staff Development, major meetings and extra curricular

| Name          | Position          | Course / Training / meeting / capacity  | Venue/ Comment                  |
|---------------|-------------------|---|---------------------------------|
| T.M Hawadi    | Director          | - Mining Indaba Conference<br>- Africa Mining Partnerships<br>- ZMDC board meetings (Board Member of Afri-Sino and Anjin) | Cape Town<br>Cape Town<br>China |
| F.B. Mupaya   | Chief Geologist   | Board meeting for the Pan African Minerals Development Company  | South Africa                    |
| S. Mpindiwa   | Senior Geologist  | - Training course on radiation protection<br>- Mineral Exploration Course   | Gabon<br>South Korea            |
| T. Kashiri    | Geologist         | -Remote sensing course  | India                           |
| L. Shawarira  | Geophysicist      | - Geo Information Systems   | India                           |
| N. Tavengwa   | Librarian         | ABCD Operational Skills Transfer Course   | Morgen College ZINTEC           |
| F. Mandikutse | Assist. Librarian | ABCD Operational Skills Transfer Course   | Morgen College ZINTEC           |

### 3. PROGRESS ON DATA ACQUISITION AND MANAGEMENT, AND PROVISION OF SERVICES

#### Geological Mapping

Following comprehensive discussions between the department, a British Geological Survey expert who was visiting the country, and local geologists from Industry, a decision was made to change the approach to the production of the much-awaited 1:1 million-scale Geological Map of

Zimbabwe. This means that production of the map will be delayed. Activities in the last quarter include revision of the explanation to the map and editing of the draft map.

The department assisted in the preparation of a tender document to facilitate helicopter-borne high-resolution geophysical mapping of the eastern part of the country. This border area had been previously omitted in phase II of the CIDA aeromagnetic survey due to security issues at the time.

### Mine Visits

| PROGRAMME                       | PROGRESS  | COMMENTS   | OFFICER  |
|---------------------------------|---|--|--|
| <b>Mine evaluations</b>         |   |  |  |
| <b>Manicaland District</b>      |   |  |  |
| Chiadzwa Diamond Fields         | The Director accompanied the Permanent Secretary on the President's familiarization tour of the Chiadzwa diamond fields.  |  | M.T. Hawadi  |
| Anjin Diamond Mine              | The Director, Chief Government Mining Engineer, Mr Tawha, F.B. Mupaya, Mr Sigwadi and Mr Makandwa inspected Anjin diamond operations in Chiadzwa to monitor mining compliance ahead of the Kimberley Process monitor's visit. | The company has made much progress in its operations. However, there are a few areas that need improvement such as having important documentation in English and observing safety issues such as the wearing of hard hats. | M.T. Hawadi, C.Z. Tawha, F.B. Mupaya, J. Makandwa & R. Sigwadi |
| <b>Chegutu/ Norton District</b> |   |  |  |
| Pitana 33 Gold Claims           | The claims host a sheared quartz porphyry   | Gold values of the sheared quartz porphyry are encouraging. Infill sampling is required to determine the dimensions of the orebody.  | F.B. Mupaya  |
| Twalumba Chrome Claims          | A partially backfilled open pit has in it an exposed a chrome seam.   | The miners were given a pitting programme to provide more exposure.  | M. Mangezi S. Lunga  |
| Lenny Gold Claims               | The miner is searching for the possible extension   | Two shafts sunk did not intercept any  | M. Mangezi T. Kashiri  |



|   |  |   |  |
|---|--|---|--|
| <p><b>Guruve District</b><br/>7 Chrome claims in the northern part of the Dyke (Lukerby Investments, San He Mining, Kehrai Investments, Turn-Off Investments, First Access Investments and Dakota Mining)</p> <p><b>Inyati</b><br/>Inyati Mine</p> <p><b>Maramba Communal Lands</b><br/>Tauya Gold Claims</p> | <p>of the old Lenny gold reef.</p> <p>Most of the claims have several tonnes of stockpiled eluvial chrome. The chrome is scooped from valleys and off slopes.</p> <p>10 000m of core drilling was completed. Resuscitation of the mine is in progress.</p> <p>Extensive shear zones have been exposed by random pitting.</p> | <p>orebody. The miner was advised to search with a long trench and if again the results are negative, he has to abandon the prospect.</p> <p>The visit was aimed at assessing eluvial chrome operations in view of the expiry of the window to export unprocessed chrome. No company has ventured into establishment of a smelter. They have just been exporting the chrome.</p> <p>The claims have encouraging gold values. The miner was advised to systematically trench the strike-extent of the shear zones.</p> | <p>F. Muzanenhamo<br/>R. Sigwadi<br/>W. Chigwida</p> <p>M. Mangezi<br/>E.T.<br/>Mugandani</p> <p>F.B. Mupaya</p> |
|---|--|---|--|

**Geological data Management and Archiving**

150 library books, 3 Technical Report files, and 10 EPO reports were added to the ABCD data base.

**Other Services**

- 540 people visited the Drawing Office to buy bulletins and maps, and to enquire about ground available for EPO and SG applications. Over 800 publications were sold to the public.
- Over 146 people visited the library to research on the mineral potential of the country.
- 20 mineral and rock determinations were carried out for the public.

## **5. VEHICLES**

If funds for fieldwork are allocated a fair amount of work could be undertaken as the department is proud to have two reliable field vehicles, a Landrover and new Nissan Hardbody.

## **6. EXTERNAL RELATIONS**

The following organizations visited to discuss mutually beneficial relationships:

### **Korea Institute of Geoscience and Mineral Resources (KIGAM)**

Although a MOU jointly drafted by the Zimbabwe Geological Survey (ZGS) and KIGAM has not yet been signed, the ZGS is already benefiting tremendously from the training sponsored and conducted by KIGAM. One geologist completed a training course at KIGAM during the first quarter of this year. A second geologist is currently attending a course.

### **The Japan, Oil, Gas and Metals National Corporation (JOGMEC)**

JOGMEC will train five ZGS geologists soon after the signing of a MOU that was jointly drafted by the two organizations.

### **Council for Geoscience**

The CEO of the Council for Geoscience (Geological Survey of South Africa) visited to hold talks on possible cooperation between his organization and the ZGS. The Council for Geoscience has established a geological mapping training school, and they see opportunities in offering training to Zimbabwean geologists. Currently the ZGS lacks capacity to carry out geological mapping. The two organizations will enter into a MOU to facilitate cooperation in various fields including training in geological mapping, data management and in other fields.

### **British Geological Survey (BGS)**

The BGS expressed willingness to assist in the resuscitation of the Zimbabwe Geological Survey through technical and financial assistance, and training. Previously, the BGS together with the BGR (Germany Geological Survey) have been the greatest supporters of the ZGS.

### **Canadian International Development Agency (CIDA)**

CIDA officials from the Canadian Embassy in Harare visited to assess possibilities of resuming assistance to the ZGS. CIDA has previously assisted with aeromagnetic mapping of the country and establishment of the Data Management facility.

## **Comments**

Although, little fieldwork was undertaken due to budgetary constraints, it is hoped that the Geological Survey will come to its feet soon with help from several international organizations who have expressed a willingness to cooperate with Zimbabwe.

*Bornwell Mupaya*

## 3D EARTH EXPLORATION (Pty) LIMITED

*Geophysical Contractors & Mineral Exploration Consultants*

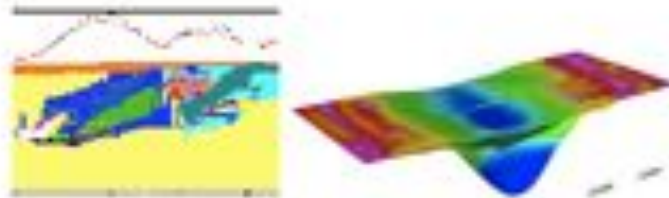
3D Earth Exploration is a Botswana-registered company operating in the SADC area and provides the following services:

- Ground geophysics surveys
- Physical rock properties measurements ..... & ..... 3D Data processing and interpretation

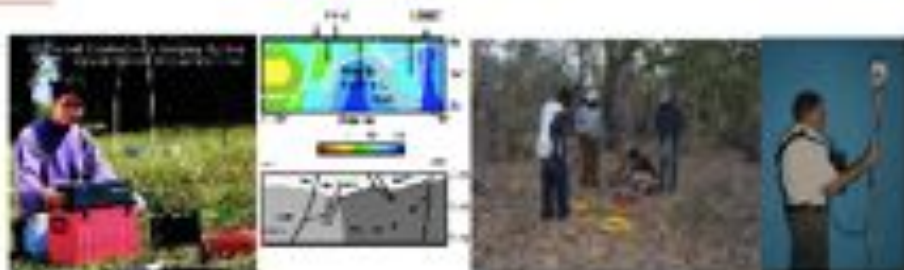


GGP MPP-4000 - Magnetic susceptibility and conductivity probe and suite ..... Onsite data processing

- 3D magnetic and gravity data modelling



- CSAMT and ground magnetic surveys



- 3D Data integration and visualisation



**CONTACT:**

For more information please contact Mr Millary Gumbo +263-773-569112, email: [mgumbo@mevab.co.zw](mailto:mgumbo@mevab.co.zw)

## MINING INDUSTRY NEWS

*Mitchell Maisera*

### **Introduction**

The Mining industry enjoyed the continued increase in metal prices during the first quarter of 2011. If such a trend is compounded by increased efforts in minerals exploration, the country could benefit greatly in the mining sector.

### **Platinum**

The firming of platinum group metals prices helped revenue inflow to Zimplats and other players in the sector. The prices continued to improve thus reflecting market sentiment as well as the impact due to production constraints in South Africa, the world's leading PGM producer.

Zimplats benefited from a \$29 billion capital expenditure budget. \$500 million will be used to fund Zimplats' phase 2 expansion, which is progressing well. To guard against power outages, the company secured a contract to import electricity directly from Cabora Bassa, in Mozambique. The company also registered a 150% increase in profit to \$US85 million in their first fiscal half year report.

On indigenization programmes, Zimplat has been encouraged to contribute to the country's development by contracting local companies for its various expansion projects in Zimbabwe. To this end the company has committed US\$1 million to agricultural programmes within the Mhondoro-Ngezi community. The money is earmarked to promote conservation farming, animal husbandry, poultry businesses and vegetable gardens.

### **Diamond mining**

Zimbabwe is set to earn more money from its diamonds after the Kimberley Process Certification Scheme (KPCS) cleared it to resume exports from Marange. The KPCS lifted objections to the country's right to sell diamonds from Marange; a move that will increase inflows into Treasury. This has increased demand for Zimbabwe's diamonds, with India's diamond market hoping to import about six million carats.

Rio Tinto's diamond output from their Murowa Mine increased by 43% in 2010 to 178,126 carats, up from 124,422 carats in 2009.

The Minerals Marketing Corporation of Zimbabwe started selling diamonds from Chiadzwa to local companies for cutting and polishing, in accordance with Statutory Instrument 157 of 2010 promulgated in November last year. The instrument stipulates that 10% of all diamonds mined in the country should be reserved to these companies.

### **Gold Mining**

Zimbabwe's gold refiner, Fidelity Printers and Refiners, agreed to sell more than 100 of its gold milling plants located across the country to an Israeli-based firm Slash Wood Private Limited for an undisclosed amount.

The Zimbabwe Mining Development Corporation (ZMDC) stepped up efforts to revive three of its gold mines: Jena, Sabi and Elvington. They injected US\$2,4 million in Jena Mines, which is already producing about 26kg of gold a month. ZMDC is conducting feasibility studies to revive the Elvington Mine following almost eight years of inactivity. The mine currently produces an average of 120kg of fine gold a year from the sands. Jena Gold Mine reported an increase in gold production from 40 to 60% following a \$100 million capital injection into the construction

of a power line from Munyati thermal power station. Construction of the power line provides the mine with fairly uninterrupted power.

Freda-Rebecca Mine's mineral resource estimate was upgraded by 61% to 1,67 million ounces following a re-evaluation. This development came as the Freda-Rebecca Phase II expansion programme is progressing well. The mine's average monthly productions achieved for the three- and six-month periods to 31<sup>st</sup> March 2011 were 2858 and 2720 ounces respectively. For the financial year to date, Freda Rebecca has produced 27,211 ounces of gold, with 3573 ounces being recorded for March.

The Chamber of Mines engaged international investment banks to secure funding for the gold mining sector. A detailed report that highlights the opportunities in the sector had been compiled for potential investors by the London-based and world-renowned consultancy GFMS World Gold Analyst. Mines will have to negotiate their capital requirements with the banks involved.

### **Coal Mining**

Hwange Colliery Company Limited received a major cash boost of close to US\$20 million from a local bank and the Development Bank of Southern Africa. The funds will go towards recapitalisation of the open cast mines, the acquisition of dump trucks and bulldozers as well as for upgrading equipment such as the dragline. This would see the company benefit from increased coal production and support its forays into regional and overseas export markets.

Hwange Colliery Company Limited, which was exporting coal only to surrounding states, began delivering coal and coke to Tanzania as markets expand into East Africa.

### **Mineral Exports**

According to the latest figures from the Chamber of Mines mineral exports, excluding diamonds, more than doubled to US\$1,3 billion last year, largely driven by higher output and strong commodity prices. At least US\$600 million was earned from exports in 2009. Last year, platinum shipments accounted for almost a third of mining revenue with exports amounting to about US\$409 million. Gold exports earned the country about US\$380 million. Coal achieved US\$87,9 million while ferrochrome brought in US\$134 million.

## **News about Zim Geoscientists**

It is with some degree of sadness that we record the death of **Dr Clive Stowe** at Howick, Kwazulu-Natal on Friday 13<sup>th</sup> May. Clive joined the Geological Survey in 1958 and between then and 1963 he mapped and published on the geology west of Shurugwi (Bulletin 59) before taking up a new lectureship at the University College of Rhodesia and Nyasaland with Geoffrey Bond as Professor. He later moved to take up a post at the Precambrian Research Unit of the University of Cape Town, where he remained until his retirement. He is widely published on the structural and tectonic history of the Zimbabwe Craton and more widely in linking the Magondi Orogeny through to the Kheis in the Northern Cape where his later research was centred.

We also record the passing of **Dr Matthew Armstrong**, who in the 1990's was seconded from the British Geological Survey as Editor to the Zimbabwe Geological Survey. He died in Edinburgh on 29<sup>th</sup> April.

More joyously **Arthur Barrie**, who was cartographer and then Chief Cartographer at the Geological Survey from 1949 to 1996, celebrated his 80<sup>th</sup> Birthday on 30<sup>th</sup> April with family and

friends. Arthur is responsible for the drawing of many of the regional geological maps we now use.

Congratulations go to **Allan Mashingaidze** for being elected Second Vice-President to the Chamber of Mines for 2011-2012. The new President is Winston Chitando (MD, Mimosa) and the First Vice-President is Alex Mhembere (MD, Zimplats). The Immediate Past President of the Chamber is Victor Gapare (GAT Investments).

**Sharad Master, Axel Hofmann** and **Andrey Bekker** and a student from Wits were in Zimbabwe carrying out field work and sample collection for age dating and isotope geochemistry within the Magondi Belt and Sijarira Group. They were in Harare briefly and Sharad gave a talk at short notice to the Society entitled, "Chemostratigraphic correlation of Neoproterozoic carbonate sequences from Morocco and Mali, with applications to the Sijarira Group, Zimbabwe." They have been given funding for further research, so we should be seeing more of this trio.

**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](mailto:drchats@yahoo.com) or [makari@zol.co.zw](mailto:makari@zol.co.zw)**



## **GSZ Research and Development Fund**

Enquiries relating to the distribution of funds through this facility should be made through the standing Chairperson.

## **Conferences**

**GeoSynthesis 2011**, 28 August – 2 September, 2011, Cape Town International Convention Centre, South Africa. Integrating the Earth Sciences – Africa's Crust & Mantle, Mineral & Hydrocarbon Resources, Energy, Geoheritage and Geofuture. [www.geosynthesis.org.za](http://www.geosynthesis.org.za)

**10<sup>th</sup> International Kimberlite Conference**, 6 – 11 February, 2012, Bangalore, India.  
[10ikcbangalore.com](http://10ikcbangalore.com)

**The 23<sup>rd</sup> International Geological Congress**, Cape Town, South Africa – 2016.

**Geological Society of Zimbabwe****Summer Symposium 2011****25th November 2011****Call for Papers**

We are looking for 15-minute presentations on a broad range of subjects of interest to geologists

We are planning an interesting set of presentations on:-

- Advances in Mineral Exploration Techniques
- GPS Application
- Database management and Quality Control
- Skills Situation and Challenges
- Environmental Management
- Topics of general interest to Geologists

If you would like to present, please let us know ([andrew.dutoit@zimplats.com](mailto:andrew.dutoit@zimplats.com))

*Please put this date in you diary now*

**GEOLOGICAL SOCIETY OF ZIMBABWE:  
CONTACT DETAILS OF MEMBERS OF THE EXECUTIVE  
COMMITTEE FOR 2011**

| NAME              | PORTFOLIO                        | EMAIL                        |
|-------------------|----------------------------------|------------------------------|
| Bouamar, Houda    | Chairman/Website                 | hbouamar@hotmail.com         |
| Mupaya, Bornwell  | Vice Chairman                    | fbmpaya@yahoo.co.uk          |
| Musiwa, Kudzie    | Hon. Secretary                   | kudzie@eng.uz.ac.zw          |
| Mwatahwa, Collins | Hon. Treasurer                   | cmwatahwa@unki.co.zw         |
| Broderick, Tim    | Newsletter Editor                | makari@zol.co.zw             |
| Chatora, Daniel   | Field Trips                      | dchatora@gmail.com           |
| du Toit, Andrew   | Chairman, Summer Symposium       | andrew.dutoit@zimplats.co.zw |
| Gumbo, Hillary    | Membership Secretary             | hgumbo@mweb.co.zw            |
| Mugumbate, Forbes | Geological Survey Representative | fmugumbate@gmail.com         |
| Revitt, Anthony   | Bulawayo Representative          | anthonyrevitt@yahoo.co.uk    |
| Isadore Manuel    | Talks                            |                              |

## **Institutional Membership, 2011**

African Consolidated Resources  
Anglo American  
Ashanti Gold  
Canister Resources  
Casmyn Mining (Pvt) Ltd  
Chamber of Mines  
Duration Gold Zimbabwe (Pvt) Ltd  
Geology Department, UZ  
Goldsearch Technical Services  
Metallon  
Mineral Resources Centre, UZ  
Pan African Mining  
Rio Zim  
Samrec Vermiculite Zimbabwe (Pvt) Limited  
Sandvik  
SMC  
Trojan Nickel Mine  
Zimari Holdings  
Zimbabwe Mining Investments  
Zimbabwe Platinum Mines Limited