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# SASA Bulletin

Exploring the Depths of Southern Africa

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SPELAEOLOGICAL
ASSOCIATION

# SASA Bulletin

**Volume 47 · 2025**

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## Associated Clubs

**Speleological Exploration Club**
SEC.caves.org.za

**Cape Peninsula Spelaeological Society**
CPSS.caves.org.za

**Potchefstroom Potholing Club**
PPH.caves.org.za

## Cover Image

The cover photo reveals a magnificent curtain of flowstone within Baboon Cave on Bolts Farm near Sterkfontein, a natural sculpture captured by Thilo Muller during the cave's recent survey.

Inside Cow Bell Grotto - p.5

## In This Issue...

# President's Message

South African Spelaeological Association

It's an incredible honour to write this foreword as President of SASA. To be honest, it's a role I never imagined filling — but one that I'm deeply grateful to have been nominated for. From the start, one of my priorities was to see this Bulletin published again. As fate would have it, the idea surfaced during my very first trip with Thilo Muller, and the timing couldn't have been more perfect. I'd therefore like to introduce and thank Thilo, our exceptionally capable editor. His enthusiasm and speed in bringing this Bulletin together have been remarkable. I've even had a sneak peek at the next issue — and trust me, it's looking fantastic!

With Sec's ever-increasing membership, it is great to see cave exploration in Gauteng gaining popularity during a time when more people are staying at home.

The PPH, who for most of the past decade dedicated weeks away from home to discover, explore, and survey caves in Botswana, has returned to South Africa and went straight back into exploring the cave landscapes.

While some CPSS members have been rediscovering caves and exploring the hills outside Oudtshoorn, others have taken on administrative roles, as the Cape cave access policies for several caves are being evaluated.

What is even more exciting is the fact that we are going through a very healthy period of cave discovery, and this is not limited to small chambers but includes record-breaking systems, formation-rich extensions, and often in areas where one would not have expected these discoveries.

If you've enjoyed the articles in this Bulletin, I encourage you to reach out to your club committees — all of the historic SASA Bulletins are available in PDF format.

This is also your invitation to contribute to the next edition. And don't worry if you don't see yourself as a writer — sharing your caving story is easier than ever. With today's technology, even a simple voice note can become a great article once transcribed.

**About SASA and Its Members**

Many cavers first hear of SASA through their clubs but may not fully understand what SASA actually is. Behind the scenes, SASA is made up of the chairpersons and vice-chairpersons from our three sister clubs — CPSS, SEC, and PPH — along with a small number of individuals who have become truly indispensable to South African caving.

The 2025 committee includes some of the most knowledgeable and experienced cavers in the country, and it's an absolute privilege to serve alongside them.

**Honouring Jacques Martini**

This year brought with it a deeply meaningful moment — the awarding of Honorary Membership to Jacques Martini. The man whose name appears on a large number of cave surveys produced, Jacques's contribution was significant. The recognition was both well-deserved and long overdue.

Sadly, Jacques passed away in 2024. Roger Ellis, who had long kept in touch with him, raised concern when correspondence ceased, and only recently were we able to confirm his passing. My heartfelt thanks to Steven Tucker and Roger Ellis for championing this award.

**Exploring Botswana**

This Bulletin also takes us beyond South Africa's borders, with a look at the Gcwihaba Caves Project in Botswana. What started as a request to CERAC evolved into years of dedicated exploration by members across all our clubs. Congratulations to everyone involved — your work is reshaping our understanding of Botswana's karst landscape.

A special thanks to Roger Ellis for publishing the first reports from this groundbreaking project. His continued participation in every expedition is nothing short of inspiring. The discoveries, surveys, and stories shared here will soon be appreciated by cavers worldwide.

**Looking Ahead**

Please take a moment to visit the SASA website at www.sasa.caves.org.za — ask questions, make suggestions, and maybe even become the next caver who helps shape the future of our community. You never know; you might one day find yourself serving on the committee, joining the proud ranks of those who have contributed for decades.

When I started caving, I never imagined I'd still be at it so many years later. But once you've wriggled through a tough squeeze, stood in a pristine formation-filled chamber, or shifted the last rock to reveal a new passage, it becomes part of who you are — and it never leaves you. Enjoy this Bulletin — it's packed with incredible content, stories, and achievements. See you underground... or as we like to say, see you in the dolomite!

**Andre Grove**

President, South African Speleological Association

# From the Editor

In 1981, a short article appeared in the Free Caver Bulletin entitled “Why I Like Going into Caves”, complete with terrible grammar and obvious spelling mistakes. It was written by a ten-year-old, and it’s hard to believe that 43 years later that same author is now editor of this Bulletin. That little article illustrates a rather important point: caving is one of the few pursuits where anyone, regardless of education, language, age, background, or confidence level, can become part of the story. Whether your passion is guiding first-timers on their maiden crawl, pushing an unexplored lead, documenting history, surveying and mapping, digging in uncomfortable places, or doing serious work in hydrology, biology, geology, or archaeology, you can contribute. And the SASA Bulletin is one of the places where that contribution becomes part of our shared record.

As I worked through the articles for this issue, one theme kept surfacing: nothing underground happens alone. Cavers are working with landowners, communities, and even governments. In Botswana’s Gcwihaba project, that partnership opened previously undocumented passages. In Leboeng, Limpopo, residents pointed out new caves, which cavers, together with a tourism group, surveyed so they can be protected and used by the local community. At the Confidence Reef Mine, a mining-history enthusiast asked cavers to map old workings before they vanish. The same spirit runs through safety: the Bats Cave incident, a five-metre fall, is honestly described so we can learn. It led directly to a full underground rescue exercise to test real haul-routes under rescue pressure.

This issue also reminds us that caves are not static exhibits. They flood, shift, collapse, open, and close. Rising water in Armageddon Cave has already drowned passages that were routine a few years ago, forcing teams to accept that some areas may now be gone for this generation, turning yesterday’s trip notes into historical records. In another piece, we go back to a cave that “everyone knows” and realise it has never actually been documented: no survey, no proper description, just a few lines in a cave register. We also rediscover a cave on the Cape coast, last described in the 1800s, complete with historic markings, traces of guano digging, and archaeological evidence of people who used it long before us. These places are archives of knowledge, and they deserve to be written down.

Finally, this volume includes a tribute to one of South Africa’s most prolific cavers, not only a writer and explorer, but also a mineralogist credited with the identification of multiple new minerals. His work is a reminder that our caves are not just playgrounds; they are scientific sites of global significance, and the people who devote their lives to documenting them deserve to be remembered.

If you’re reading this and you cave in Southern Africa, you are allowed to send in your stories. You are allowed to say, “We found something blowing behind a cattle fence and we think it goes.” You are allowed to submit a survey sketch that’s still muddy at the edges. That’s how this issue was built, and that’s how future issues will be built. Your voice belongs here.

# Preamble to the SASA Bulletin

The SASA Bulletin is the official publication of the South African Spelaeological Association (SASA), serving as a platform for documenting and sharing knowledge related to caving and Spelaeology in Southern Africa. Published annually, or occasionally bi-annually depending on submission volume, the bulletin features a curated selection of articles ranging from high-quality cave research to detailed trip reports and citizen sXcience contributions.

Most of the content comprises research-oriented articles, reflecting ongoing exploration, mapping, hydrological studies, cave biology, and geological insights. While these works are not always peer-reviewed in an academic sense, they uphold a high standard of clarity, relevance, and technical accuracy.

The SASA Bulletin functions as both a historical archive and an evolving body of informal scientific literature, providing value to researchers, conservationists, and the wider caving community.

# Cow Bell Grotto

How a cave was named after a passing herd of cows

By Roger Ellis

## Introduction

The Wonderfontein Cave is located on the north bank of the Wonderfontein Spruit some four kilometres north-north-west of Oberholzer. It has been known to local inhabitants at least since the 1840s and was visited and briefly described by early explorers—Thomas Baines in 1850, Carl Mauch in 1865 and Emil Holub in 1873. The Inter-Colonial Irrigation Commission (1905) and Anderson and Stanley (1909) also made mention of the cave and of the stream entering it from the Wonderfontein Spruit.

It was during the time of Carl Mauch that another cave was discovered close to the Wonderfontein Cave. Wonderfontein, being the known cave, was therefore deemed the old cave and the new cave, being newly discovered, was named New Cave. At the time it was a spectacular cave and was opened to the public and called the Carl Mauch Caverns. Later it was quarried away and today only a remnant of the cave still exists. It is believed New Cave has a water connection to the Wonderfontein Cave.

The Wonderfontain Cave is historically important as it was visited by explorers as far back as 1850. It is a remarkable example of a system formed by phreatic solution at a single level along a closely spaced rectilineal network of joints. The system has been completely surveyed and totals 9,3 km in length making it the second most extensive cave known in the country.

A survey of the cave was commenced by Kent and Hugo in 1961/62 using a plane table and telescopic alidade. Excellent control was obtained by linking the underground survey to a trigonometrical beacon and to plumb lines down “Kent’s entrance” and the “Keyhole”. The accuracy was high, ±0.1 m. Approximately 2 km were surveyed by this method. Steel survey pegs were used that remain to this day and from which the remainder of the system was surveyed during 1975 by Kavalieris and Martini using a 30 m steel tape and Brunton compass.

*The Sinkhole at the Rock Wall*

Up to this time systematic survey and complete exploration of the cave had not been possible, although almost all easily accessible portions had obviously been explored by previous visitors. The total extent is 9.3 km, of which the 1975 survey discovered perhaps a further kilometre of unexplored passages.

## Background

From the introduction it can be seen that the Wonderfontein Cave has been known to explorers for many years, but it was only in the 1960s that systematic exploration of the cave was begun by members of the South African Speleological Association (Transvaal Section) (SASA Tvl) and later by members of other caving organisations. For many years the cave became a favourite caving destination, but it was only on the arrival of Jacques Martini and Imantz Kavalieris from overseas in the early 1970s that an interest in doing a complete survey first arose. The survey conducted in 1975 revealed a cave of considerable proportions and numerous entrances which periodically had an active stream running through it and on occasions almost flooded completely. It was during one of the dry spells when the stream wasn’t flowing that the cave was surveyed and revealed Eel Passage at the western end of the cave, which is normally completely flooded and down which the water from the Wonderfontein Spruit flows to re-enter the dolomitic aquifer.

Many years later, in 2013, Gerhard du Preez and Edward Netherlands

from the North-West University in Potchefstroom undertook a project to study the nematodes of the Wonderfontein Cave and the effect of polluted mine water on the health of the ecosystem in a karstic cave environment in the Witwatersrand Basin. These projects entailed numerous visits to the Wonderfontein Cave assisted by members of the Potchefstroom Potholing Club (the Potchpotholers) and required the team members getting very wet and muddy as they splashed around in the cave taking samples and catching elusive catfish for pollution analysis.

It was during one of these visits on 22 January 2013, after the team had left the cave and were making their way back to the parked cars for a well-earned braai (barbecue), that the entrance to what was later to become Cow Bell Grotto was discovered. Roger Ellis and Andre Grove, who had made their way out of Wonderfontein Cave ahead of the others, were the first to notice the sinkhole at the end of the blind valley and to clamber down and feel the air movement emitting from the low crawl at the bottom. After calling the others over, Gerhard du Preez and Edward Netherlands were tasked with being the first to enter the tight crawl and, after some time, returned to say the air was blowing strongly but that digging was going to be necessary. The comment from Roger that followed the trip was:
"Good work lads on the discovery of the potential cave at the end of the blind run-off zone, this could be something really worth returning to. Looking at the survey overlay on the Google Earth image it certainly suggests that whatever is down there is basically overlying Eel Passage at the end of the cave. It's going to be interesting; we need to get back there soon." Soon, as it turned out, was not to be until 21 July 2019.

**The Return**

The preamble to the return trip on 21 July, which Roger put out to the club members, read as follows:

"Here is a little background to our forthcoming trip. Back in the day when we were helping Gerhard and Ed catch barbel in Wonderfontein Cave and enjoying the company of the lady students from NWU as we floated down the river passage and then later headed for the braai fire, Andre and I discovered what might be a new extension to the Wonderfontein Cave. As we made


*The rock wall and sinkhole in the background*

our way back to where we had parked the cars we came across a small sinkhole at the end of a substantial blind slumped zone where the run-off surface water disappears underground. Clambering down the hole we discovered at the bottom a flat-out crawl, blowing nicely. We then called Gerhard and Ed who immediately ventured into the crawl but soon got to a point where some clearing work needed to be done and, distracted by the thoughts of beer and braai and the ladies, the team decided to leave the dig to another day. Well, the day has almost arrived and what lies ahead at the end of the crawl remains to be discovered and that's where you all come into play. While I wander off and try to locate the ingress point of the water which enters at the end of the right-hand passage in the long crawl in Abe Bailey Cave, you will all be sweating it out in the dig and breaking into a whole new system. I look forward to hearing the outcome after I return to sit at the fire with a beer in hand."

Well, that day arrived and, after meeting on the outskirts of Carletonville, the team comprising Roger Ellis, Andre Grove, Hennie Stander, Gerhard du Preez, Daneel du Preez, Anton Jacobs, Steven Tucker, Hani Williams, Chris Williams, Dawid van der Spuy and Quintin de Boer drove to the site and geared up, ready to begin the exploration.

**Cow Bell Grotto**

The first team down the sinkhole was Gerhard, Steven, Hennie, Anton and Daneel, while Roger, Andre, Dawid, Hani, Chris and Quintin set off across the veld to locate on the surface the spot where the water enters the end of the long left-hand crawl in the Abe Bailey Cave. Meanwhile, the digging team, after some serious digging, clearing and moving large rocks, finally broke through into virgin cave. The new discovery, comprising three interconnected chambers, came as a pleasant surprise to the cavers, as the chambers are well decorated with some spectacular flowstone formations—unlike Wonderfontein Cave and the Abe Bailey Cave where the formations are old and damaged. Continuing their exploration, the cavers reached the apparent end of the cave where two narrow, steeply descending climbs blowing strongly gave access to a lower-level passage which showed evidence of having been visited before. Without a doubt the cavers had established a link with Wonderfontein Cave, but the question was "where?"

With time moving on, the cavers decided to retreat when they encountered Hani and Dawid who, after having assisted Roger and team on the surface, decided to find out how the cavers were doing underground. After a tour through the chambers, the whole team exited the cave to join the others who were gathered around the barbecue fire, eager to hear the news of the discovery.

As the tale unfolded and the stories ebbed and flowed, a huge herd of cows wandered past with a number of the cows carrying cow bells. It was just at this time that the name of the cave was being debated and, with the intrusive clanging of the bells, it was inevitable that the noise would give rise to the name of the cave. It was Hennie's suggestion, and the name of Cow Bell Grotto was unanimously adopted.

**The Survey Meet**

Following the discovery of the cave, it was imperative that a return meet be set up to survey the cave and to ascertain exactly how Cow Bell Grotto related to the Wonderfontein Cave, and to take pictures to share with the club. With everyone having other commitments, it was only on 29 September 2019 that a return trip was arranged. Those in attendance were Andre Grove, Steven Tucker, Tyron Clark and Hani Williams. The underground team comprised Andre, Steven and Tyron, while Hani remained on the surface to watch the cars and to prepare the traditional barbecue. Andre's account of the trip is as follows:

"We surveyed the cave—well, Steven surveyed and we explored. Tyron took some awesome photos and everything went according to plan. Once you are in the main passage linking with the Wonderfontein Cave you can see why the early surveyors missed the new extension. I think we were all in agreement that the chances were slim that any survey team would have stumbled across the link between the room and the rest of the cave, but I suppose that is

*The rock wall and sinkhole in the background*

Wonderfontein Cave
Depth: 38m
Original Wonderfontein survey by: SASA Transvaal, 1975
Cow Bell Grotto survey by: Tyron Clark, Steven Tucker 2019
Drawn by: Steven Tucker 2019 UIGs2 Grade 4-3-B
COW BELL GROTTO
EEL PASSAGE
KEY HOLE
DEREK'S EXIT
DEREK SE UITGANG
RIVER PASSAGE
THE BIG BLOCK
THE GOTHIC WAY
JAN'S WAY
KENT'S ENTRANCE
KENT SE INGANG
FAULT PASSAGE
PIT ENTRANCE
INGANG VANAF KUIL
MAIN ENTRANCE
HOOF INGANG
RIVER ENTRANCES
INGANGE VANAF RIVIER
VLEIRIVIER
SWAMP
MOERAS
CANAL
KANAAL

the nature of caving. The new extension does, however, make for the perfect exit from the Wonderfontein Cave with a beautiful reward at the end of any trip. On the way out of the cave we arrived at the car to find a perfect feast prepared for us by Hani—boerewors, buttered rolls and tomato sauce awaited us. Thank you so much, Hani; it was really GREAT of you to spoil us in such a way.

Below is the original survey of the Wonderfontein Cave with the missing section added in at the right place by Steven. I want to thank Steven for the willingness to survey all of our recent discoveries. It has been a pleasure being able to see and also document these caves, and Steven has been doing an incredible job on his own to make these surveys a reality. Thank you, Steven."

Later, when asked about concerns for the conservation of Cow Bell Grotto, Steven Tucker commented:

"I've also been wondering about its conservation. I don't think any non-caver would get to it from the Main Entrance (Wonderfontein Cave). In the past, before the river passage had water, maybe, but now they won't. The new entrance is a possibility for people to get in, but I think most would look into it and think the crawl looks horrible and wouldn't do it—especially because you can't see a large chamber from the start of the crawl. Still, it is something to think about."

And so the tale of the discovery, exploration and survey of Cow Bell Grotto comes to an end. The conservation of the cave remains a concern which, in time, will need to be addressed, but in the meantime the Grotto remains hidden and unannounced, to be visited only by concerned cavers. Finding Cow Bell Grotto is a reminder to us all that, in the words of Dr Jacques Martini, one of South Africa's greatest cave explorers, "a cave is NEVER finished", and with Wonderfontein Cave in mind, Cow Bell Grotto just goes to prove the point.

# Leith's Cave Rediscovery

By Sinèad Hattingh

**Overview**

After the helicopter flight on 8 December 2017, it revealed a lot of possible gullies and shadows resembling caves that now needed to be explored, which might lead to the finding of the cave mentioned by George Leith in his journal[1]. So, on the morning of 14 December 2017, I, Sinead, and two fellow explorers, Rudolf and Chris, went in search of "Leith's Cave" again. Maybe this would finally be the day we found it. I met Chris about two years ago; he is a local guide doing tours of the St. Blaize Trail and the Oystercatcher Trail, and I asked him back then if he had any knowledge of this specific cave. He said he had never heard about it but that he was very keen to help us find this cave. So today he joined the mission, and it was great to have him with us again, as he was part of the search from almost the start. We decided on one specific gully that we needed to descend; it was very close to the lighthouse and not a long walk at all. We went out prepared with ropes and everything, just in case we needed to abseil to the bottom of a cliff, and because Leith mentioned that he used a ladder to get to the bottom.

Now the adventure began, not knowing what we would find. We left the trail and started scrambling down a bushy, rocky stretch—no real path visible, not an easy scramble at all—but finally we reached the rocky coastline. In this specific gully, there was only one small cave, perfect as a shelter for when it rains—nothing

really interesting. We saw that the only option now to get to the gully we wanted to find was to do some bouldering over rocks and walk along a steeply inclined rock slope (about 40 degrees) to get around to the next gully. Rudolf went ahead of me and Chris and disappeared around the corner. A few minutes later, we finally got to turn into the next gully, and that moment was something I will never forget. I saw a small cave entrance about 7 m above sea level, and we would need to climb up to the entrance. That made me very excited, as this started to look exactly like the cave Leith mentioned. Rudolf was then almost at the entrance, and he started waving at us to come, so then I also knew there was definitely a cave there and not just a shallow recess. Rudolf waited for us at the entrance, and we joined him about five minutes later. The scene that met my eyes was really amazing, as this looked like a cave that goes in very deep, and this could possibly be the cave that we had searched for during the last couple of years. Could this long search finally come to an end? It was so exciting and sad at the same time. All of us now got our headlights out and prepared to enter this mysterious, newly rediscovered cave.

The first great sign that it was the cave was that, at the entrance, man-made steps led down into the cave. We could definitely see that this cave had been used a lot by people in the past. We could also see a lot of holes dug out and sand heaps on the cave floor. That must have been when they dug out the guano back in the 1800s, but now there is not much guano left in the cave; however, we did see a few bats flying around. A lot of the sea caves we had previously found along the trail never went so deep that we needed to use our torches, but this cave, just like Leith wrote, is a cave in the true sense of the word. It was pitch dark inside the middle chamber, and even four torches could not adequately light up this chamber. Along the walls of this cave, we found names written on the walls, possibly burnt in by using a candle. Close to the entrance, there were only a few names here and there, but at the back of this cave, the left wall was full of writing. We saw a date that looked like 1844 or 1864, so it was possibly the men who mined the guano who wrote their names on the walls. At the back of the cave, we also found an old newspaper, but unfortunately, we could see only that it was an Afrikaans paper and the date, which was 26 February, but no year, which was a pity. Also at the back was a small fireplace that they had used. The other great and interesting find in this cave was not far from the entrance on the right-hand wall as we entered the cave: unidentified bones fossilised in the side of the cave wall. Flowstone and dripstone formations are also present in this spectacular cave. Stone tools and a shell midden were found inside and outside the cave, which definitely indicates there were Khoisan/Bushmen using this cave

*Names and dates burned onto the overhanging west wall of the cave*

long before the men mined for guano. So we have no doubt that this is the cave mentioned by Leith.

The cave looked like a real hotspot for locals back in the 1800s, but now it seems untouched for many years. However, we did find two footprints in the middle of the cave leading inwards, but no other tracks—just there and nowhere else. But seeing that the cave is now not much frequented means that track could also have already been there for a few years. It might have been that of a fisherman looking for shelter, and it was of a big-sized shoe like a number 11 or 12. Unfortunately, we could not find any remains of the ladder that Leith mentioned had been used to reach the bottom of the cave, but, of course, during the past century, the ladder could have been removed for safety reasons or even rusted away, as the coast is not called the Cape of Storms for nothing. So the only part that ever made us doubt a little that this is the cave was that the ladder was missing, but everything else fits his description perfectly, so we are 99% certain. So finally, years of exploration paid off, and it was a great day of exploring.

**Cave Description**

To reach the entrance of the cave, descend a steep slope; when at the entrance, man-made steps lead down a short slope into the first chamber. Thereafter, it gets really dark. The second big chamber has the most dug-out holes and a lot of sand heaps. The cave continues even further back. A smaller tunnel now leads on the right to the back of the cave, where the cave finally terminates in cavernous darkness. The cave seems to be about 60 m in length; the middle chamber has the highest ceiling at about 8 m, but this is all estimation, and a proper survey will be done in the near future.

**Access**

To reach the cave, leave all the paths and descend a steep, rocky path over and through bushes to reach the bottom coastline, then climb over some boulders and walk on inclined rocks to the next gully where the cave is situated. Then some more walking on inclined rocks will lead to the bottom, now very close to the entrance. But before reaching the entrance, climb up a steep slope on very loose rocks and sand. It looks like there was a huge rockfall or mudslide in the past. This route is not for the average hiker to attempt. It requires rock skills and ropes, because one mistake will cause injuries. We used a rope to climb up to the entrance just for a handhold, preventing us from falling if we should lose grip and start sliding. It took us about 35 minutes to reach the cave.

Interesting finds in and outside the cave: fossilised bones, shell midden, stone tools, flowstone, dripstone, graffiti, and bats.

Outside the cave, stone tools, more shell midden, and ash layers were found.

Surrounding area: In the next gully, only one small cave was found—nothing worth a mention. In the other nearby gully, there was only a small sea-cave tunnel that is worth a mention; the sea is still rushing halfway through this tunnel. Almost back at the top, a very flat horizontal overhang was found, as well as an old quarry that had been mined for stone and sand.

**Exploring team**

Sinead Hattingh, Rudolf Hattingh, Chris Carr.

**Reference**

Leith G. & Jones T.R. (1899) On the Caves, Shell-Mounds and Stone Implements of South Africa. Journal of the Anthropological Institute of Great Britain and Ireland 28 (3/4), 258–274.

# The Bats Cave Incident

By Thilo Muller & Edmund Harris

On a Friday evening in winter, a group of seven cavers assembled at the usual meeting point at Oaktree Garage, a well-known filling station often used by cavers in the area, and proceeded to the entrance of Bats Cave. The group had visited the site on a number of occasions, and this outing was expected to be a routine trip.

They reached the entrance at approximately 19:45 and began their descent. The group leader waited at the base of the entrance climb to ensure that all members arrived safely before proceeding to the squeeze leading to the permanent ladder. One by one, the cavers descended the 7-metre ladder, calling out their positions and assisting each other by holding the ladder steady at the base, a common practice that improves stability.

At the bottom of the ladder, cavers typically step off to the right. Directly behind this landing area is a second vertical drop of about 5-metres, known as the Keydrop. For this reason, having someone positioned at the base of the ladder is a standard safety measure, particularly when newer members are present.

The fourth person to descend was familiar with the cave and had participated in previous caving trips. After stepping off the ladder safely, she inadvertently moved backward and to the left, into open space, falling down the Keydrop.

The caver stationed at the ladder base immediately alerted the group. The group leader quickly descended to assess the situation and was relieved to find the fallen caver conscious and able to speak, though winded. Communication remained clear, and no immediate signs of severe trauma were observed.

Out of caution, a team member exited the cave to contact the Cave Rescue Team and alert them to a possible rescue. Meanwhile, the leader and another team member remained with the injured caver and began assessing her for injuries.

Once the initial shock had passed, the injured caver reported that she was able to walk and expressed confidence that she could exit the cave under supervision.

With the leader guiding the way, the group made a careful exit. Upon reaching the surface, the cave rescue team was contacted again to notify them that a rescue was not necessary. The injured caver was taken to hospital, arriving at 21:40. Subsequent examination revealed a fractured vertebra requiring surgery, along with other minor injuries.

Although the South African caving community has enjoyed a long period without serious incidents, this case underscores the importance of basic safety measures, maintaining situational awareness underground and established emergency protocols. Small lapses in judgement can lead to serious consequences. The team's willingness to document the incident without prejudice demonstrates a commitment to transparency and provides a valuable learning opportunity for the broader caving community.

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# Bats Cave Rescue Training

## Lessons from the Key Drop

By Kyle Walton

Rescue. Something that often gets forgotten about (or ignored) as we don't want to consider that a possibility. However, it is a reality of the risks that we undertake every time we, intrepid adventurers, venture underground. As such, we need to always be ready. Nothing brings this reminder home as much as the events of June 14th, 2024. On this day, one of our members misstepped and fell down the Key Drop, resulting in a fractured spine. While on this day the party was able to self-rescue and had a positive outcome, the events raised questions around what would be the best course of action should rescue have been required:

Within Bats Cave there are several entrances/exits as seen in Figure 1, with Figure 2 outlining the possible exits from the Key Drop.

According to the Figures and remembering that the incident occurred at the Key Drop, the closest exit would be E1. However, for those of us who have undertaken the adventure that is Bats Cave, we understand that it is a tricky climb up the ladder and through the narrow tunnel to E1. As such, the more feasible route could perhaps be Skylight at E4. While this is a longer route to travel, it theoretically would be easier and faster, with less risk to a patient whilst carrying a stretcher through.

As the discussions continued, the gears in my mind started turning. The idea for practical rescue training was born, with the idea to test these theories and ultimately answer the question of which option is best, all while giving valuable opportunity to cavers to learn hands-on in a rescue environment.

Just over a year after the event, we gathered at Oaktree Garage on 26th July 2025 for a great day of training and camaraderie. In attendance, 17 SEC members, 2 students from the USA working with Dirk at the Lee R Burger Foundation, and a guest from Mountain Search & Rescue (MSAR). SEC is lucky to include 6 members who form part of MSAR and bring a wealth of knowledge and experience with them.

The plan for the day was simple:
Meet at Oaktree at 09h00
Briefing at 09h15
Scenario 1 at 09h30
Main Exit (E1) from bottom of Key Drop
Break at +/- 12h30 for lunch and Scenario 1 Debrief
Scenario 2 at +/- 13h30
Skylight Exit (E4) from bottom of Key Drop
Scenario 2 Debrief at +/- 17h00

The briefing was short and simple, and everyone quickly understood the plan. The team gathered their gear and the club kit required and we set out into the cave.

We quickly got into position, with half the team at the bottom of the Key Drop to learn patient packaging and place Connor, our first victim, into the stretcher, while the rest of the team remained at the top of the ladder in order to start rigging.

We rigged a haul system in the tunnel leading to the top of the ladder, with the ropes running to a redirect off of a column in the ceiling before dropping down into the Key Drop. The rigging was very standard and made easy by the fact that no bolts were required – all natural anchors could be used.

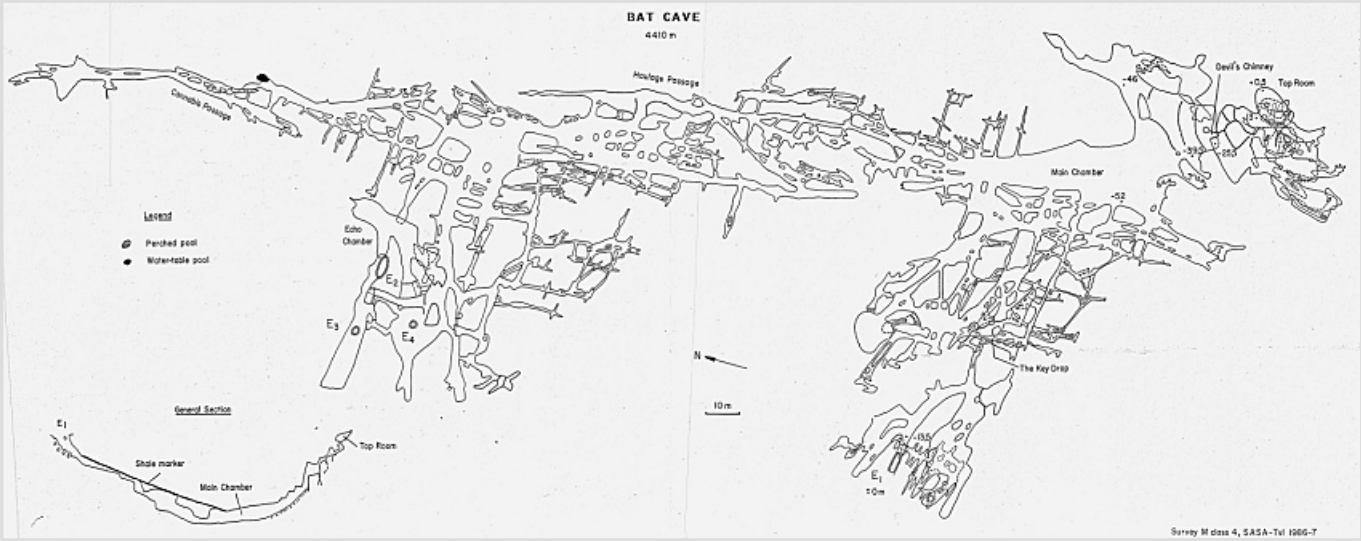



*Figure 1*

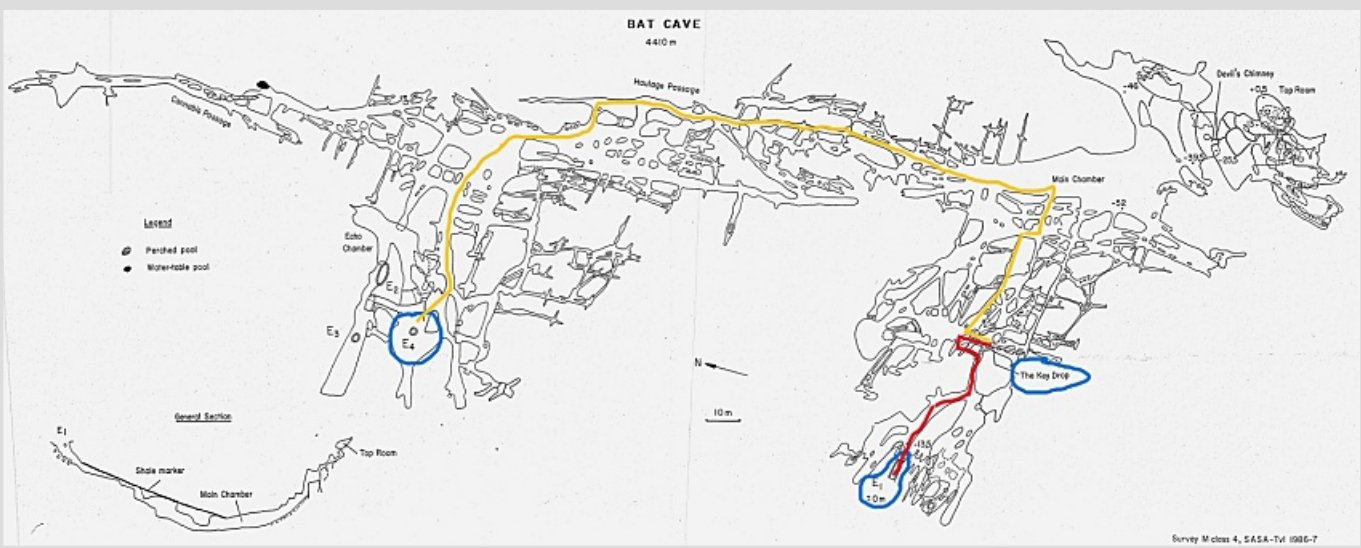



*Figure 2*

*Getting the patient up the ladder (Photo: Jadyn Matthews)*

Finally, Connor was ready and so was the rest of the team. After some brief discussions, it was decided that we would raise straight from the bottom of the Key Drop rather than walk the stretcher around to the bottom of the ladder. It was also decided that the terrain suited a manoeuvre we believe never to have been tried in SA before – a Risolutiva Pitch Exit (see Figure 3).

Two things were required to pull this off successfully – firstly, a tag line at the foot of the stretcher in order to control the swing and the movement of the stretcher as it was raised off of the ground. Secondly, a "jockey" on the ladder in order to control the movement of the stretcher in the second phase of the raise as well as the pitch exit itself.

The raise was executed perfectly, despite a brief pause at the pitch exit in order to allow a group of cavers from Wild Cave Adventures to pass by before we continued and blocked the tunnel leading to the exit completely.

Once through the pitch exit, the stretcher was disconnected from the ropes, and the team now faced the hardest challenge of Scenario 1 – the tunnel. This area is so narrow that only one person can fit at a time, on their hands and knees. As you can imagine, therefore, moving the stretcher through this section was going to be very difficult. Our resourceful team, however, made a plan – the required people split up between the front and back of the tunnel, with two members lying on the floor in the tunnel, so that the stretcher could be turned sideways and slid over them, allowing the stretcher to navigate through the tight space. This was aided by a team member propping themselves up on the roof of the tunnel and pulling the stretcher up and over the teammates on the floor, whilst coordinating with members on the other side of the tunnel.
Once through the tunnel, the cave opened up, allowing for the rest of the team to move through the tunnel while the last few members de-rigged and packed away the gear used.

There was a brief pause while the exit slope was rigged with a rope, and, once ready, the stretcher was then attached and slowly moved up the slope. This was accomplished in a caterpillar fashion with the stretcher passed hand-over-hand between members with brief pauses for teammates to leapfrog each other (in order to be in front of the stretcher and ready to carry again). The rope, in this scenario, serves as a backup in case the stretcher is dropped, so as to prevent the stretcher (with our patient) from falling and sliding to the bottom of the slope. Given how steep the exit slope is, however, we chose to rig a basic haul system as well in order to assist the team in carrying the stretcher up the slope.

And so in a relatively short time, the stretcher and all team members were once again out of the cave. The takeaway? The rigging and stretcher raise is surprisingly easy to get to the top of the ladder. However, the tunnel afterwards is so tight that you will inevitably have a very uncomfortable patient and a very high risk of injuring them further (which is of particular

*Photo: Dani Walker*

concern for suspected spinal injuries). The steep slope at the end is decidedly not an issue, but definitely still both a risk and hard work.

We took this time to head back to Oaktree, have a rest and lunch and reset.
It was then time for Scenario 2. We set out once more to the cave entrance and split the team again into riggers and stretcher team. For this scenario, we only required a small rigging team, so 5 of us went to the top of the Skylight while the rest returned to the Key Drop in order to package our next victim (patient), Sarah.

Once again, the rigging was simple: all natural anchors were used again, utilising the small trees surrounding the Skylight. A simple haul system was constructed with our main redirect off of a tree directly over the Skylight. As such, within 30 minutes, we were ready.

Within another 30 minutes, we heard the team with the stretcher below us. This time, we were going to need a jockey ascending the rope next to the stretcher. The stretcher was rigged for horizontal raise, but in order to fit through the Skylight, the jockey was required to do an orientation change to vertical orientation.

Given how successful it was in Scenario 1, we had once again decided to make use of the Risolutiva Pitch Exit. Within 10 minutes, the stretcher was raised up and through the Skylight onto the surface, allowing us to release our patient from the confines of the stretcher.

The whole day was completed by 17h00, with the team and all gear back at Oaktree in order to debrief. The conclusion was simple – despite the Skylight being farther away from the Key Drop, we successfully proved that it is faster and easier terrain to carry the stretcher. This includes far less risk to the patient, as well as simpler and faster rigging, with less risk to rescuers. The patients weighed in on this discussion, and both agreed the second scenario was preferable from a patient comfort perspective (both physical and mental).

After a long and successful day, with many laughs and lots of newly learned skills, the gear was finally

*Photo: Dirk van Rooyen*

packed into the trailer and everyone cleaned up. The team then headed off to Bushwhackers for a well-earned drink and meal, as well as many more laughs and smiles as we reminisced over a fantastic day.

I would like to extend a massive thank you to our American visitors, Sarah and Connor, who offered to play our victims/patients for the day. I would also like to say "Thank you" to the SEC members, and MSAR guest, for their time, immense enthusiasm, skill, care and determination to carry out these exercises whilst keeping all involved safe. It, as always, was a pleasure spending the day with you all.

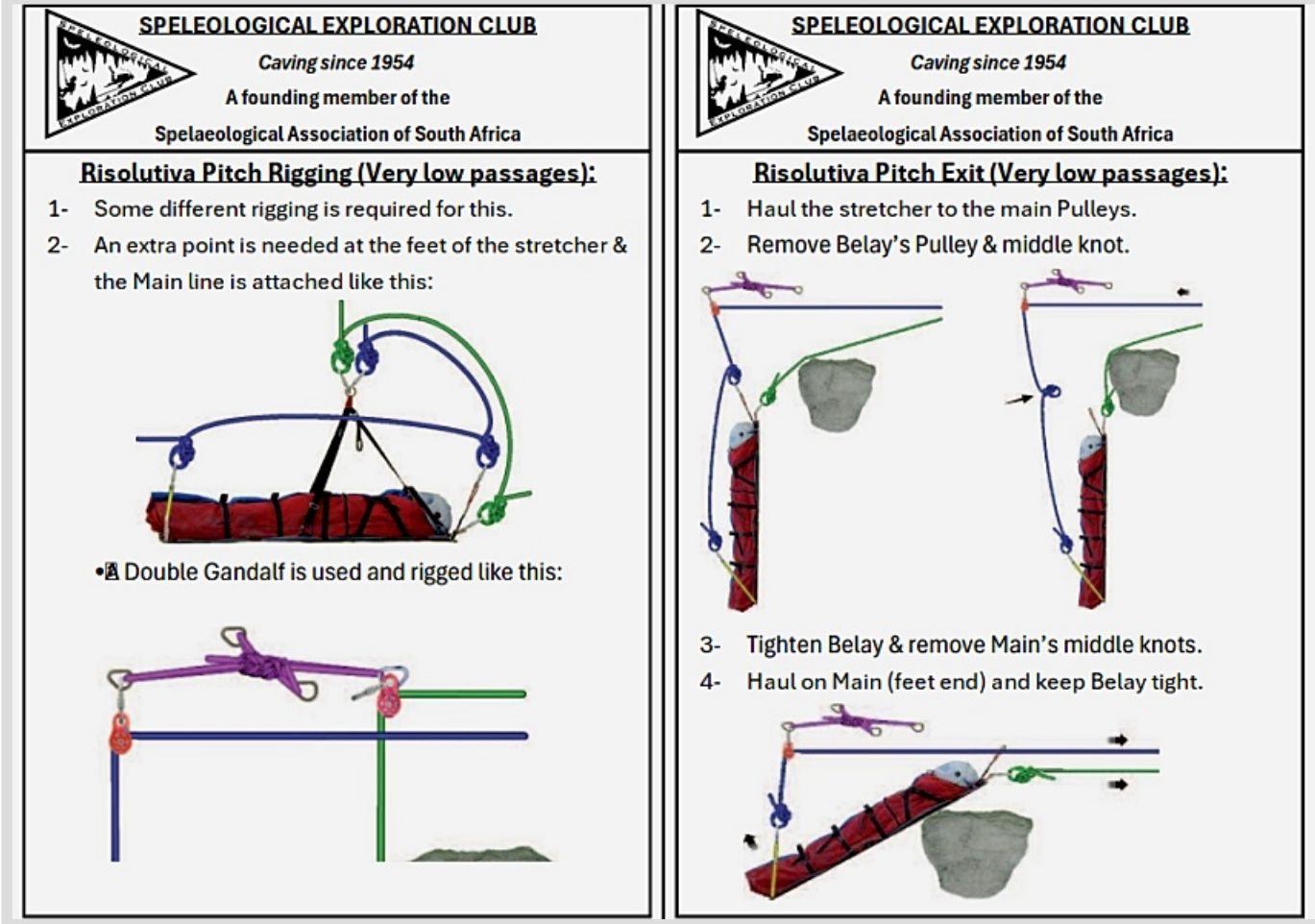



*Figure 3: Risolutiva Pitch Exit*

# New caves explored in Leboeng

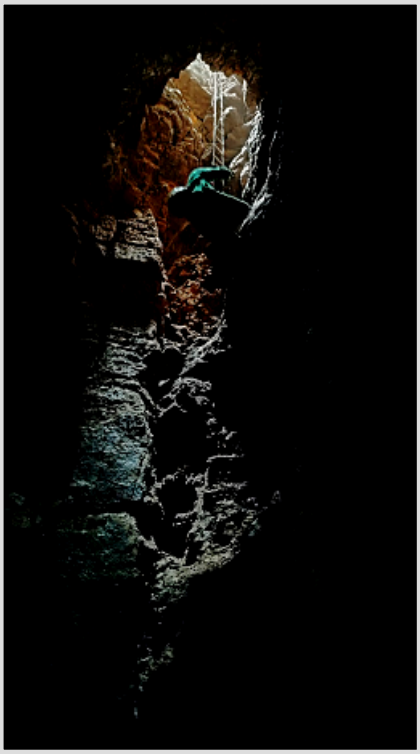
By Jenny Livingstone, Photos by Dirk van Rooyens

In 2024, Kevin Leo-Smith, the Director of Safari Investment Advisory, contacted Dirk van Rooyen regarding three possible caves, whose entrances community members had discovered near Leboeng. Kevin has experience in developing conservation-based tourism projects and wanted to have the caves explored to assess their potential as revenue generating attractions that could promote tourism and create employment opportunities for local community guides.

Leboeng is a small village in the Greater Tubatse Local Municipality, situated on the R36 between Ohrigstad and the Abel Erasmus Pass in Limpopo. Well known to tourists in the area are Echo Cave and Cave of Man, while for cavers there are Jock's Cave, Sting Cave, Porcupine Privy Cave and the most exciting of all - Grot Serunecjar.

Closer to Leboeng, several caves have been explored by SEC over the years. Caves such as Morabas Cave, Nappy Cave and Muti Cave with recently dead dogs, nappies and skulls didn't leave much inspiration... but we're always keen for something new.

On Saturday the 26th October – Steven Tucker, Dirk van Rooyen, Dané Durandt and Jenny Livingstone drove down to the site to meet Kevin. Kevin had brought along community



*Steven descends into Tswene Cave*

members Rodney Moropana and Tebogo Prosper Sebatana as well as his son Brent Leo-Smith, co-founder of Painted Dog TV – a wildlife and conservation media company. Brent, in turn, brought along his cameraman Bazel Mogale and presenters Victoria and Gareth Nuttall-Smith.

After receiving permission from the Headman, Piet Mashaba, we headed into the bush in search of the potential caves.

### Tswene Cave - 26 Otcober 2024

The first one — which we named Tswene Cave — is a tiny, mostly vertical cave, 28 metres deep with 44 metres of passage. Its entrance is an 11-metre pit, which we descended using a caving ladder. Brent, Kevin, Jenny, and Dané waited at the bottom of the pit while Dirk and Steven ventured in deeper. Bazel took up filming duty, just in case we stumbled upon some spectacular fossil find. (Of course, history has taught us that famous fossil finds almost always only appear when the day is long, the camera batteries are dead, and at the least expected moment).

Aside from a baboon skull - the cave's namesake - there wasn't much more to see beyond some foul-smelling rubbish. Dirk and Steven, taking care not to dislodge rocks, criss-crossed their way down to the lowest section, finding a tight squeeze before a dead end.

### Inja Cave - 26 October 2024

Inja Cave — named after the many disturbing remains of domestic dogs we found in various stages of decomposition — was a larger, more promising cave about 25 metres deep, with 79 metres of passage in total. Its entrance is a 9-metre crack, which we descended using a caving ladder. In addition to the dog remains, we found some broken pieces of pottery at the bottom of the crack.

As we climbed down a short sloping passage, we found the bodies and bones of more dogs. The passage opened out into a pretty 19-metre-high chamber. Delight came in the form of tiny furry pups clinging upside down as their mothers fed them in a bat nursery high up above our heads. Dismay followed in the form of numerous enormous cockroaches — ostensibly drawn in by the decaying dogs.

Tebogo made some music by tapping on some hollow chert layers while Steven and Dirk explored a few narrow side tunnels leading off from the main chamber and all terminating in dead ends. Steven spotted some adorable whispering bats with their characteristic long ears near the end of the longest of these tunnels as well as a few not-so-adorable spiders which sent him crawling out in reverse at great speed.

### Rietpruit Nature Reserve

That evening, we were hosted by Brent at the Painted Dog TV headquarters in the Rietspruit Nature Reserve just outside Hoedspruit. The next morning, Kevin took us on a game drive, before we headed to the site of the third potential cave.

### Phiring Dam Mine Tunnel – 27 October 2024

The third opening the community had found — this one further east of Leboeng near the Phiring dam — turned out to be a 29-metre-long mined tunnel going under the road. Straight, dull, and not much to write home about. If Dané, Steven, and Dirk happened upon the Kruger Millions while in there, they didn't breathe a word of it, and their poker faces as they came out gave nothing away.

### Sekweneng Tufa Waterfall

Next, we headed along the R532 to Sekweneng – "The Place of the Crocodile". This is the local name for a living Tufa waterfall - set in a beautiful riverine forest of

*Victoria in the main chamber of Inja Cave*

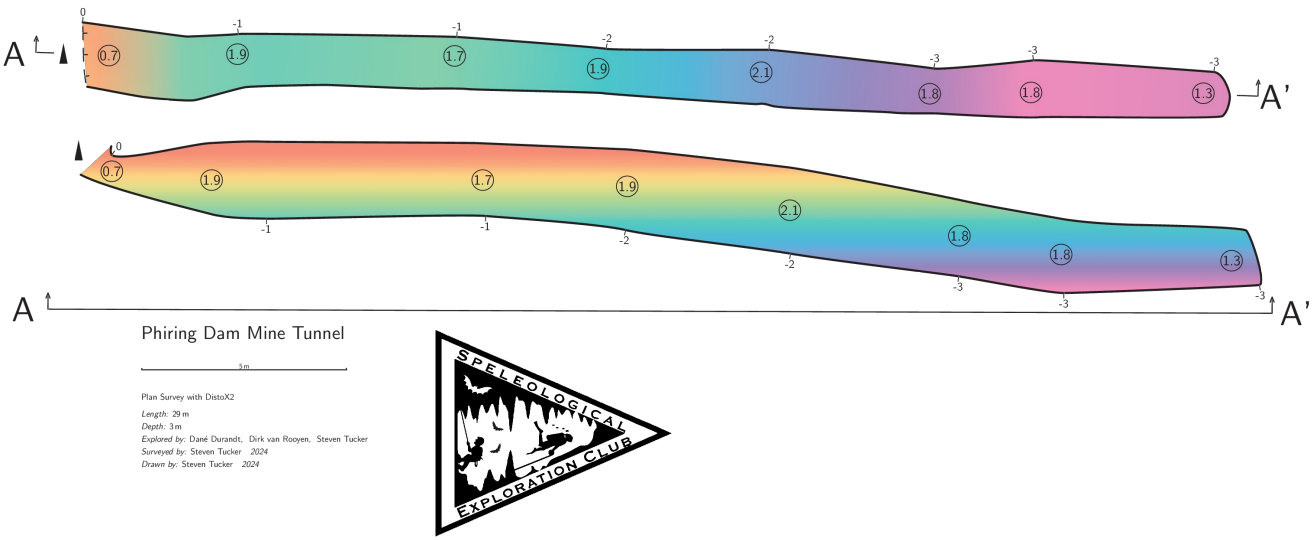
yellowwood, matumi and fig trees – and well worth a visit. The main rock formation is dolomite, rich in calcium and magnesium. The Tufa waterfall builds up over time as the mineral rich water runs over green moss and calcifies as limestone. After photographing the waterfall, we wandered through the forest, finding an old stone-built lime kiln. Dirk explained that the purpose of the kiln was to produce 'quicklime' (calcium oxide) by heating limestone to high temperatures. Quicklime was once essential for making mortar and plaster before the advent of cement. We had a swim in a refreshing pool, long having forgotten that we were at "The Place of the Corocodile". Fortunately for us, apart from some nibbles from a few curious fish, we did not encounter any large carnivorous reptiles.

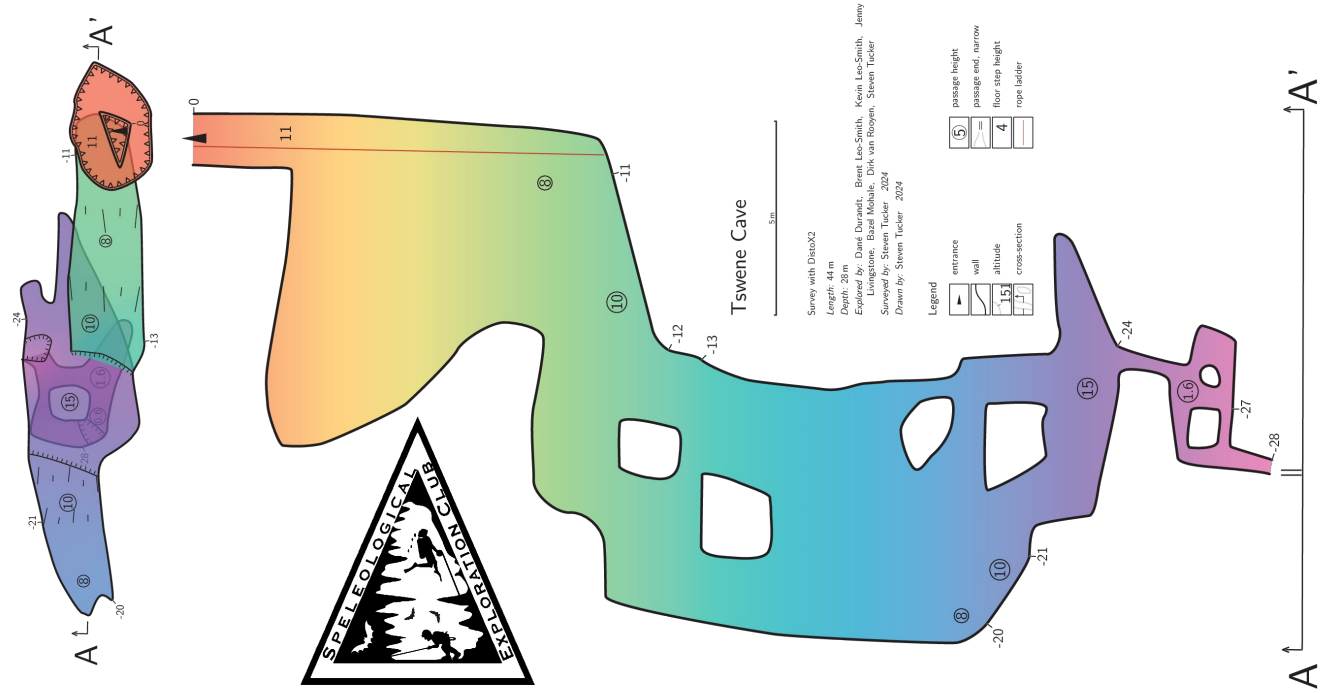
## Search for First Discovery

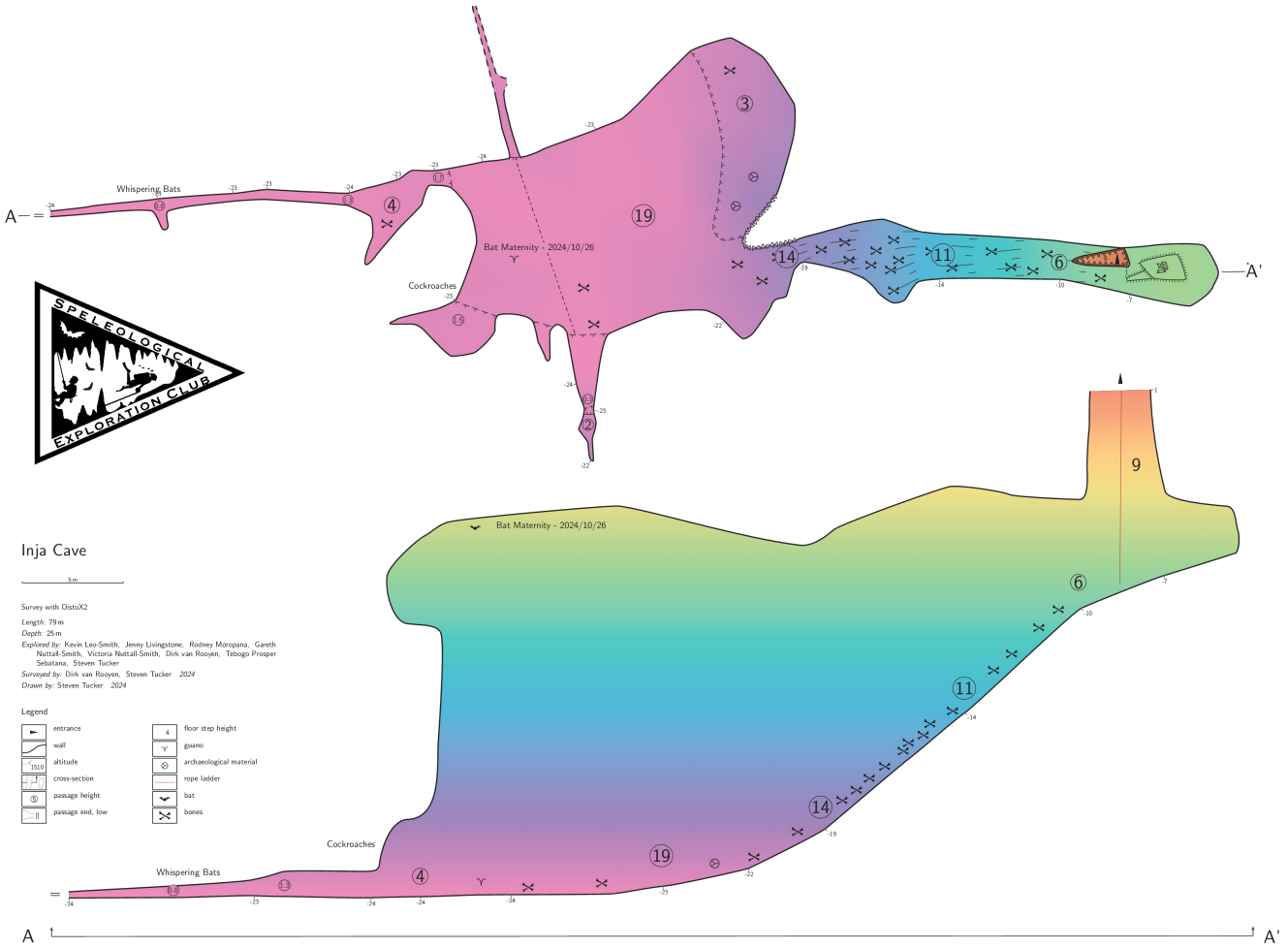
On our way back via Ohrigstad, we tried to locate the entrance to First Discovery — a cave first explored by CERAC in February 1997. Neil Ringdahl's Ohrigstad Camping Weekend, published in the Record of the Transvaal no 43, suggests it has 723 metres of passage and is the longest Tufa cave in South Africa. We searched through thick vegetation but came up with little more than scratches. Dirk eventually found a promising blowing crack, but by then it was late, and we were tired. It was time to call it a day.

Two of the caves mentioned in this article, First Discovery and Muti Cave, were explored and surveyed many years ago, but those surveys have never been published – we've added them year with full credit to the original explorers and surveyors so that their efforts can be recorded.

*Dane explores the Phiring Dam Mine tunnel*




Tswene Cave
5m
Survey with DistoX2
Length: 44 m
Depth: 28 m
Explored by: Dané Durandt, Brent Leo-Smith, Kevin Leo-Smith, Jenny Livingstone, Bazel Mohale, Dirk van Rooyen, Steven Tucker
Surveyed by: Steven Tucker 2024
Drawn by: Steven Tucker 2024
Legend
entrance
wall
altitude
cross-section
passage height
passage end, narrow
floor step height
rope ladder
SPELEOLOGICAL EXPLORATION CLUB
A
A'


Inja Cave
5m
Survey with DistoX2
Length: 79 m
Depth: 25 m
Explored by: Kevin Leo-Smith, Jenny Livingstone, Rodney Moropana, Gareth Nuttall-Smith, Victoria Nuttall-Smith, Dirk van Rooyen, Tebogo Prosper Sebatana, Steven Tucker
Surveyed by: Dirk van Rooyen, Steven Tucker 2024
Drawn by: Steven Tucker 2024
Legend
entrance
wall
altitude
cross-section
passage height
passage end, low
floor step height
guano
archaeological material
rope ladder
bat
bones
Whispering Bats
Bat Maternity - 2024/10/26
Cockroaches
SPELEOLOGICAL EXPLORATION CLUB
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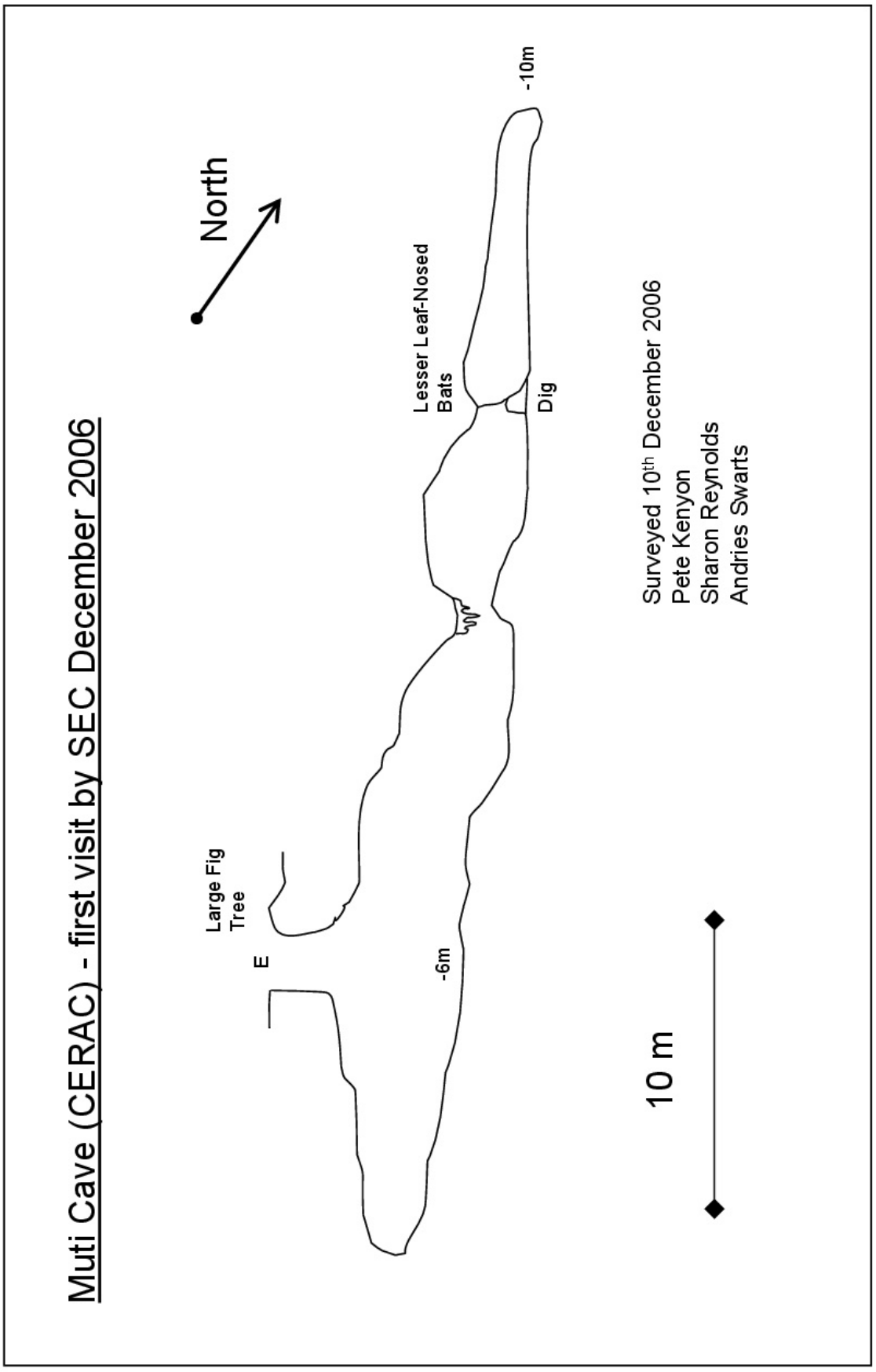
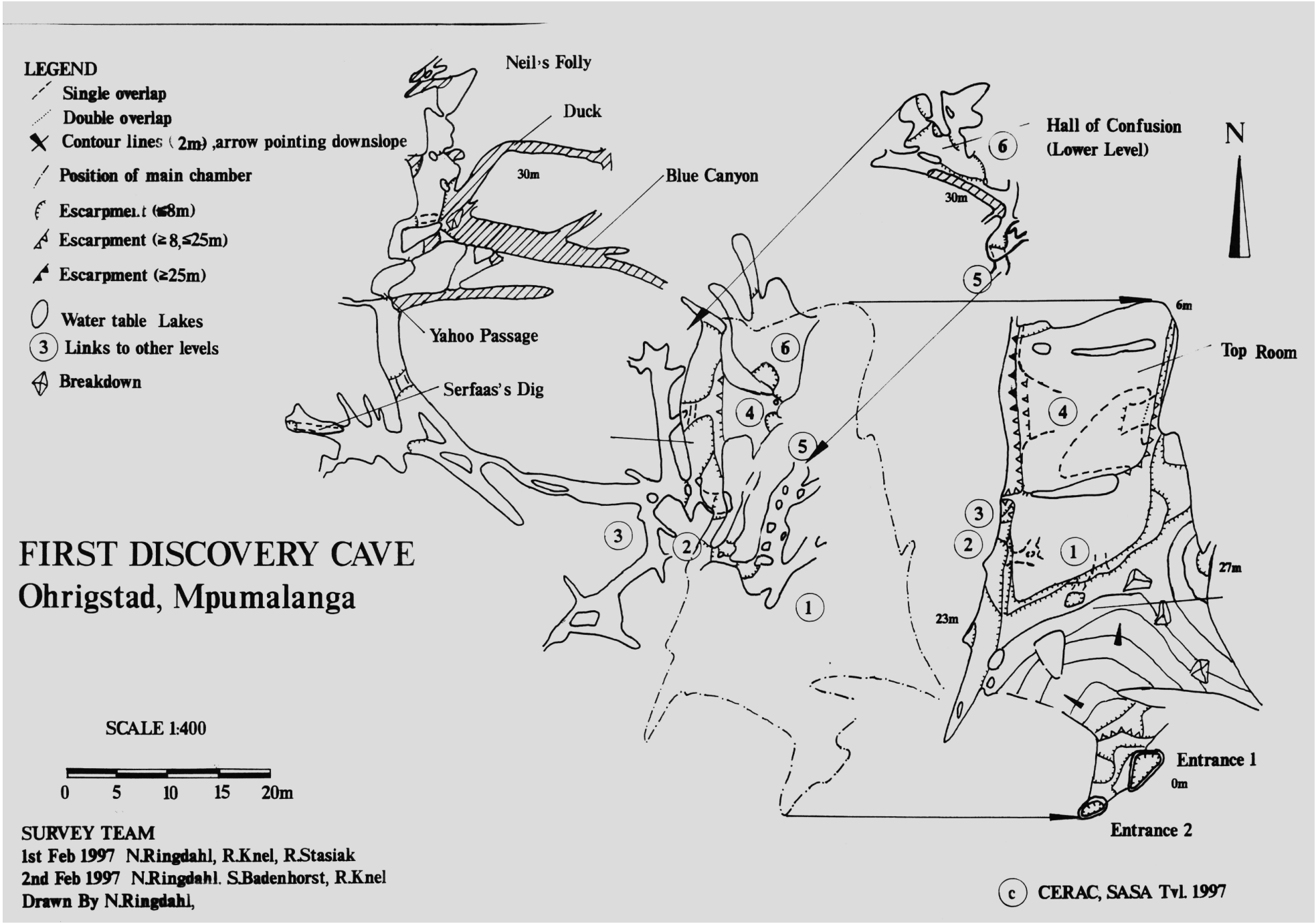

Muti Cave (CERAC) - first visit by SEC December 2006
North
Large Fig Tree
E
-6m
Lesser Leaf-Nosed Bats
-10m
Dig
Surveyed 10th December 2006
Pete Kenyon
Sharon Reynolds
Andries Swarts
10 m




# FIRST DISCOVERY CAVE
## Ohrigstad, Mpumalanga

# Armageddon: Rising Water Levels

By Dirk van Rooyen

*Figure 1: Deepest point in main passage, -255m. 2021/10/10*

Armageddon Cave is arguably the most significant speleological discovery in the South African caving community in the last 20 years. This significance is due to several remarkable features. The cave features an intimidating entrance sinkhole that measures 20 metres across and 50 metres deep. The underground passages are immense in scale, with the largest chamber measuring 20 metres wide and 30 metres high. Along the route, cavers must traverse three large pits. The cave extends 2 kilometres from the entrance. It reaches an extreme depth of 265 metres below the surface, making it the deepest dry cave in South Africa. The cave also contains unique speleothems, most notably Rapunzel's Dreadlocks — an iron-oxide curtain that stands 6.5 metres tall. This formation is the only one of its kind in the country and is possibly the largest such speleothem in the world (Tucker, 2015, 2017).

The cave has been explored systematically over several years, beginning on 13 January 2013, with trips led by John Dickie, Steven Tucker, Gerrie Pretorius, and many others. Since then, it has undergone several significant natural and human-induced changes. These include the collapse of a large boulder in the main passage, the formation of a new pit adjacent to Pit 1 (later named Pit 0), and the ongoing collapse of sections around the upper edge of the unstable entrance sinkhole. Human activity has also left its mark: the Speleological Exploration Club (SEC) installed ropes, ladders, cables, and other rigging, while trespassers entering the cave have stolen this equipment, left behind trash, and caused other disturbances (Tucker, 2015; van der Spuy, 2020).

On 15 March 2020, during a SEC trip to Armageddon, it was first noticed that some ropes had been removed and that there was evidence of unauthorised visitors — likely illegal miners — reaching the far side of Pit 2. Their presence was marked by waste such as discarded batteries, tin cans, cigarette butts, food packets, and other debris.

A few months later, on 6 June 2020, another standard trip turned into a very non-standard rescue of ten zama zamas who had been trapped in the cave for five days (for a full account of the events, see van der Spuy, 2020).
A subsequent trip on 8 November 2020 revealed the theft of more equipment, this time the rigging ropes anchoring the cable over Pit 2. On the same trip, John Dickie and Dawid van der Spuy discovered a new extension to Gerrie's Bathole that required further exploration. Further exploration continued on

*Figure 2: Below Chocolate Room, -249m. 2022/03/13*

*Figure 4: Above Chocolate Room, -236m. 2022/10/09*

21 November and was stopped at a horizontal traverse across a deep pit. A week later, on 29 November 2020, the group returned to continue their exploration by bolting this traverse and abseiling down the pit. This inadvertently led to the discovery of the most significant change observed in the cave since its first exploration. This pit was found to be approximately –265 m — a few metres deeper than the lowest point in the main passage. At the bottom of it, some water was found, and the group assumed that they had reached the water table for the first time since Armageddon's discovery.

As there was still more to explore in the furthest section of the Bathole extension, another trip was undertaken on 21 April 2021 during which David Groenewald returned to the deepest point, which had remained relatively dry.

On 26 September 2021, cavers returned to repair the rigging that had been removed by the zama zamas. At the deepest point in the main passage, Selena Dickie noticed something unusual: the small crack containing the previous deepest section of the cave was now mostly filled with water (Fig. 1), reducing the dry depth by approximately 4 m.

On 10 October 2021, a group returned to the deepest point in the main passage, where Selena observed that the water had risen by another half metre in the preceding two weeks.

*Figure 3: Bathole Extension, -236m. 2022/10/09*

On 21 October 2021, David and John returned to the Bathole and continued their exploration at the furthest point of the extension, attempting once again to cross a tricky and unstable pit they had encountered on the previous trip. This time, David succeeded in crossing into a 50-metre-long passage and, after looking down at a 5-metre pitch, discovered that the continuing passage beyond was completely submerged in water. At the time, David and John believed they had reached the end of the Bathole extension and that it had descended far enough to intersect the water table. They had not yet realised that the water level had been rising steadily for several months.

When the water level was checked again during a return trip on 13 March 2022, it had continued to rise at an alarming rate, reaching an estimated depth of –249 m (Fig. 2).

Later in the year, on 9 October, a small team descended the Bathole to check the water level again, but they could only reach about halfway down the extension before the passage became completely submerged (Fig. 3).

The rest of the team on the same trip went back to the main passage where they found that the water had risen above the Chocolate Room to an estimated depth of –236 m (Fig. 4).

On 14 May 2023, it was discovered that the low passages between Mudball and Old End were flooded, cutting off access to the back of the cave. The water level was estimated at –224 m, and it was during this trip that the formation of Pit 0 was first recorded (Figs. 5–6). Pit 0 is approximately six metres deep and was found to have collapsed in the main passage on the entrance side of Pit 1 and required additional

rigging to cross safely. The rate at which the water was rising — around two metres per month — was remarkably fast.

By 15 October 2023, the water continued to rise every month and was estimated to be at –210 m, which meant that a third of the cave was inaccessible without diving equipment (Fig. 7).

When we returned a year later, on 19 October 2024, we expected the water to be visible at the bottom of Dickie's Pit if it had continued to rise at the same rate. Unfortunately, zama zamas had once again removed our gear — this time taking the rigging ropes of Pit 1, Pit 2, and Dickie's Pit. Fortunately, the steel cables had been left behind, but this meant we could not cross Dickie's Pit. Kyle Walton abseiled down Pit 2 and climbed up the slope leading to Dickie's Pit, from where he could see a dry floor below. It appeared that the rising water level had either stabilised or slowed, with the depth still estimated at over –200 m.

This dramatic transformation — and the partial loss of Armageddon Cave — was likely the result of both natural and human-induced processes. The presence of thick deposits of cracked clay in several low sections indicates that parts of the cave were at least partially submerged in the past. The surrounding Westonaria region features numerous gold mines, and it is likely that groundwater pumping during mining operations had lowered the water table, exposing the cave and possibly contributing to the formation of the entrance sinkhole. Pumping appears to have continued for several years until around 2020, when it may have ceased following mine closures during the COVID-19 period.

Discussions with local mine managers suggested that pumping had not stopped — a claim that seems inconsistent with the rapid rise of the water table. It is possible that they were unaware of changes, or that other nearby mines had indeed halted pumping. While alternative explanations exist, this remains the most plausible hypothesis given the volume of water involved and the rate at which it rose.

We tend to think of caves as timeless — stable systems that change only over immense spans of geological time. Dolomite caves, in particular, form slowly over millions of years and are, for the most part, constant and predictable. Armageddon, however, has proved to be the exception: a vast and volatile system, partly returning to its original, submerged state. We were fortunate to explore some of its deepest and most remote reaches before they were likely lost forever — preserved now only in maps, descriptions, photographs, and the memories of those who ventured there.

**References**

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Tucker, S. (2015) Armageddon Cave. South African Speleological Association, 41, pp. 28–38.
Tucker, S. (2017) Armageddon Cave: The infamous mudwall. South African Speleological Association, 42.

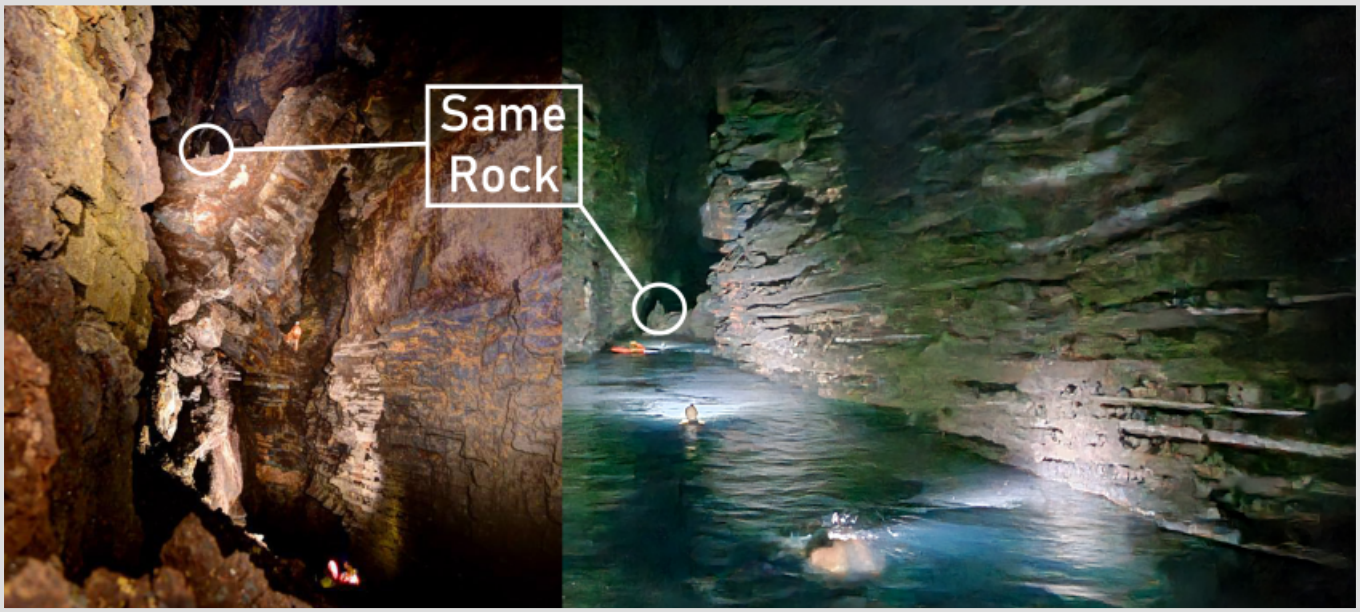



*Figure 5: -224m. 2023/05/14*

*Figure 6: Estemated Water Level, -224m. 2023/05/14*

*Figure 7: Estimated Water Level, -210m. 2023/10/15*

# Baboon Cave Survey

## Quartz, Cans, and Flowstone

By Thilo Muller

Baboon Cave is located on Bolts Farm, an area of approximately 107 hectares (1 km$^2$), situated about 3 km south-west of Sterkfontein Cave. The site comprises a number of small- to medium-sized caves, the most prominent of which is Bolts Cave.

Although Baboon Cave is visited regularly, a review of relevant bulletins and historic club newsletters revealed surprisingly little published information with the cave only being mentioned in relation to nearby projects. While anecdotal evidence suggests that the cave may have been surveyed previously, any existing surveys appear to be either unpublished or confined to non-public and inaccessible sources. One individual recalled having surveyed the cave and still had the original data at home, though this could not be verified. Given the absence of accessible or confirmed records, we undertook a new survey.

Over the course of five days, Jeremy and I conducted a systematic survey of the cave. The initial plan was to spend two days over two weekends, but the cave proved to be more intricate than expected. The survey was completed over the course of five sessions.

**Description**

The cave consists primarily of passages created by historical mining activity. As with many of the caves on Bolts Farm, Baboon Cave appears to have been either directly mined or formed secondarily as a result of mining in the early twentieth century. The exact date when mining ceased is unknown but anecdotal evidence suggests that

*Inside the Secret Garden*

*Carien Muller at the Entrance to Terminal Passage*

*Tiny quartz crystals found in the wall of the cave*

operations likely ended by the 1930s. Since then, the mined cavities have been left largely undisturbed.

Despite its anthropogenic origin, Baboon Cave contains numerous speleotherms and several well decorated sections. Notable features include the towering flowstone wall at the terminal section of the cave, flowstone passage and the far-end of Tin-can Alley.

**The main Route**

The eastern entrance provides the most accessible point of entry, allowing for a straightforward walk into the cave. From here, the route proceeds westward along the main chamber, passing beneath several natural roof openings ("skylights") before descending along the western wall. A short, steep climb leads to a western turn into a descending passage that continues toward the lower levels of the cave.

At the base of the descent, a low crawl on the right, named 'Tin-Can Alley' due to the number of old discarded tins and cans that have settled there, provides access to a small, decorated passage which terminates in a tight squeeze. After retracing this path, the main route continues beyond the Tin-Can Alley junction.

A second crawl on the right leads to an impressive flowstone formation. This passage continues through a Cocopan Cutting, an alternative route skirts around it to the right, where a pair of discarded tracks are visible.

Continuing along the left-hand passage leads to a 90-degree bend. Beyond this point, a short distance further, lies the most prominent feature of the cave—a towering flowstone wall.

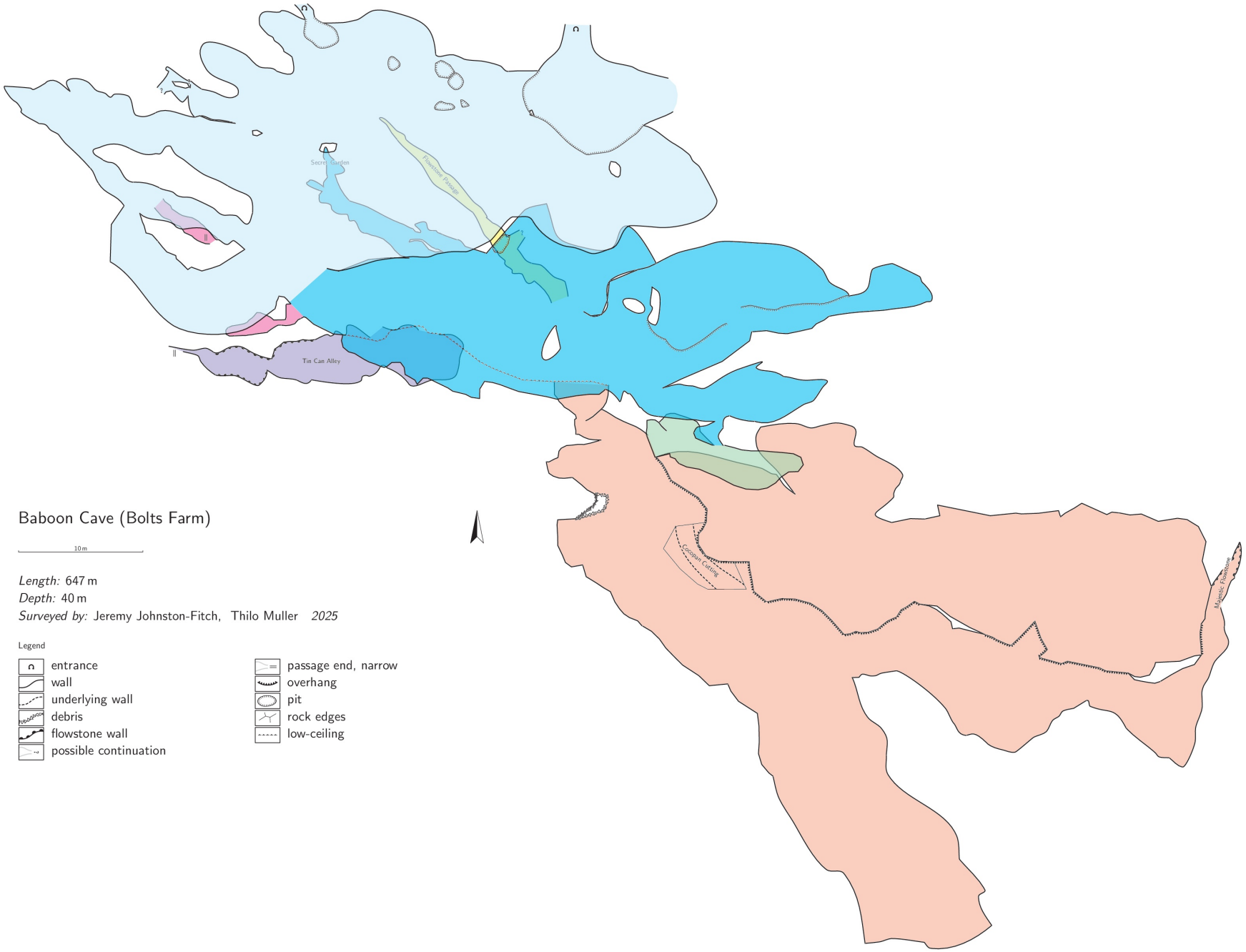
On the return route toward the eastern exit, a rope is visible hugging the incline as it meanders down from above. The origin and purpose of this rope is unclear; it may be associated with zama-zamas (informal miners) or the 'Tekkie Brigade' (informal spelunkers). The rope marks the start of the ascent out of the cave, which follows a steep climb along what appears to be a stormwater channel.

Approximately halfway up this passage, a section of rock in the wall appears geologically inconsistent with the surrounding formation. Upon closer inspection, it reveals the presence of small quartz crystals.

**Methodology**

The cave was surveyed using a Disto-X2. Data was initially recorded in TopoDroid and later exported for post-processing in Therion. Although several attempts to calibrate the DistoX2 were unsuccessful, the resulting survey is considered accurate enough for

*Jeremy surveying Tin-can Alley*




## Baboon Cave (Bolts Farm)

10 m

*Length:* 647 m
*Depth:* 40 m
*Surveyed by:* Jeremy Johnston-Fitch, Thilo Muller *2025*

Legend

- entrance
- wall
- underlying wall
- debris
- flowstone wall
- possible continuation
- passage end, narrow
- overhang
- pit
- rock edges
- low-ceiling

general navigation and contributes useful spatial data to the caving community.

**Fossils**
Approximately halfway down the western passage, 2 small loose blocks were observed containing fossilised material. From what could be seen in situ, this appears to be the only occurrence of fossils within the cave system.

The block is not embedded in the cave wall and was likely dislodged during historical mining activity. Given its loose context and no clear link to the cave, the specimens are presumed to be of limited value for paleontological study. However, its presence does suggest that fossil-bearing material may have existed in situ prior to disturbance and may warrant further investigation.

**Conclusion**
Baboon Cave presents a relatively straightforward layout, with few complex or branching passages, making route-finding uncomplicated. The cave poses minimal risk of serious injury under normal conditions. While the cave's morphology reflects its origins in historical mining activity, it retains a number of aesthetically and geologically interesting elements. It serves as a valuable introductory site for those new to caving, while still offering features of interest to more experienced speleologists.

**Project Members**
Jeremy Johnston-Fitch, Thilo Muller

# The Gcwihaba Caves Project - Botswana

By Roger Ellis

**Prelude: Background and overview of the Gcwihaba caves project and the history of the involvement of the South African cavers**

The first new cave discovery (! WaDoum Cave) in the Gcwihaba Hills in the far northwest of Botswana, was made in 1991 during an expedition to resurvey the Gcwihaba Cave (formerly known as Drotsky's Cave) by members of the British Schools Exploring Society. On that expedition Ron Ritter, an American speleologist and other team members discovered the entrance to !WaDoum Cave and commenced with the exploration of the cave. Following its discovery an expedition led by Ron Ritter was mounted in December 1993 to continue the exploration of the cave and to search for new caves. On this expedition, known as the Gcwihaba Caves Project, the team completed the exploration and survey of the !WaDoum Cave but did not find any further caves in the Gcwihaba Hills, but discovered two new caves in the nearby Koanaka Hills.
As a consequence of the expedition Ron Ritter and team members wrote a detailed report (Ritter, R. C. et al (1994) Gcwihaba Caves Project Final Report.) which was submitted to the National Museum in Gaborone. This report was read by then Vice President Ian Khama, who having a passion for developing Botswana's natural resources for the benefit of the country and its peoples and seeing the potential of developing the area and the caves for tourism, embarked on an ambitious Government project to discover and develop further caves in the area.

As Botswana had no cave explorers of its own and Ron Ritter and his team of international cavers were from across the world, Ian Khama instructed his staff to see if there were cavers in South Africa who could assist Botswana with the project. At that time the Cave Exploration Rescue and Adventure Club (CERAC) had a website through which they were contacted, and Roger Ellis and Servaas Badenhorst were invited to meet the Vice President in Gaborone.

At that meeting the Vice President explained the background to the project and invited the South African cavers to join in the search for new caves. The invitation was accepted and in 2001 with the appointment of Roger Ellis as the Expedition Leader, the South African cavers involvement in the Gcwihaba Caves Project began with a number of trips to the caves being conducted. Later CERAC withdrew from the project which was then handed over to the Potchefstroom Potholing Club (PPC) in 2011. Since then, the PPC have been involved in all the major new cave discoveries and continue with their involvement in the project up to the present.

Over the years, during the course of the South African caver's involvement in the project, a team of Botswana cavers was formed and provided with training both in Botswana, at the caves, and in South Africa. This team of well-trained cavers are now Botswana's own caving club known as the Gcwihaba Cavers who are currently leading the search for new extensions to the existing caves and who have been achieving remarkable success. Further training for the Gcwihaba Cavers is

planned for the future to bring them fully up to international standards.

**Intoduction and history**

The Gcwihaba and Koanaka Caves are located in Ngamiland District to the west of the Okavango Delta not far from the Namibian border. In June 1932 a Ghanzi trader, Mr. Martinus Drotsky was shown the Gcwihaba Cave (formally known as Drotsky's Cave) by local residents while he was travelling in the area. This visit by Martinus Drotsky brought the cave to the attention of the wider community and an article describing the cave was published in the Cape Argus newspaper in September 1932. (Cape Argus 1932). Also, in the area but just north of the village of Xai Xai are two other caves Waxhu Cave (North) and Waxhu Cave (South) which at the time were undoubtedly only known by the local Basarwa people but because of their difficult access they were not brought to the attention of the authorities.

The Gcwihaba Cave has been the subject of several scientific studies and surveys. These include an initial survey by the first Bechuanaland Geological Survey in 1943, Falcon College in 1969, and a resurvey by Garner and Ritter in 1993. The results of the 1993 survey form the basis of cave maps used in this report. Cooke and Ballieu used sediments within the cave to comment on regional paleoclimatic reconstruction. In 1975 Cooke described the local geology and topography of the area. Yellen and Brooks conducted archaeological work in the cave in 1987.

Gcwihaba Cave is a National Monument and as such is managed for the greater benefit of the nation by the National Museum. The cave also falls within a Community Controlled Hunting Area called NG4, and the Cgae Cgae Tlhabololo Trust (a Community Based Organisation) has been granted a lease for the area. The trust manages the natural resources in the surrounding area of the Gcwihaba Cave as part of a Community Based Natural Resource Management Project.

Visitors and tourists have been going to the cave for the past 80 years; however, in the past the very remote nature of the cave and the very long and often difficult roads to the cave area kept visitor numbers relatively low. More recently the cave has been identified as a significant tourism resource and has experienced an increase in visitor numbers through advertising by Safari companies and by word-of-mouth information and through the publication of guidebooks.

In October 1992 during a caving expedition led by Ron Ritter to the area, an entirely new cave was discovered in an adjacent hill across the valley from the known Gcwihaba Cave. Preliminary exploration revealed a relatively large system with an unusually high density of secondary calcite formations making the cave a spectacular feature in the otherwise harsh Kalahari landscape. Furthermore at least one passage continued down into unknown depths. Exploration of this part of the cave was severely restricted by an unusual but hazardous high CO2 atmosphere. Initial description of the cave and preliminary survey were conducted and published later in 1994. The cave was given the name !WaDoum which is a Basarwa phrase translating as Stone Throat which adequately describes the very narrow vertical entrance to the cave.

Planning for a dedicated research project was begun in late 1992 with fieldwork commencing in December 1993. A team of eight cavers, again led by Ron Ritter, spent a total of 65 days in the field. Objectives were to further explore and document !WaDoum Cave and to assess its internal environmental conditions and search surrounding areas for more caves. During the course of this expedition two additional caves were discovered in the Koanaka Hills some 20km to the southwest of the Gcwihaba Hills. Three hills make up the Koanaka range, K1 Hill, K2 Hill which lies 1.5km to the southwest of K1 Hill and K3 Hill which lies a further 12km west of K2 Hill. K1 Hill revealed no cave with a natural entrance but at K2 Hill, Bone Cave was discovered and at K3 Hill, Blue Cave was discovered.

Following the outcome of the 1993 expedition, Ron Ritter et al, compiled a report which they submitted to the Botswana Government in September 1994. The report titled Gcwihaba Cave Project 1994, Final Report, detailed the discovery of the caves and recommended that the seven Gcwihaba and Koanaka caves and surrounding area be declared a National Park and developed both for the protection of the caves and as a source of income for the local community and for the overall benefit of the country. The Gcwihaba Caves Project was thereon officially adopted and as the caves are a National Monument the project fell to the National Museum to administer.

At that time former President Ian Khama, who was then the Vice President, took a personal interest in the project and initiated a programme to search for other caves in the Gcwihaba and Koanaka hills which would enhance the tourist potential of the area. Initially the hills were extensively searched for additional caves with natural entrances but

without success. Later a number of digging operations were also undertaken in the hope of accessing the caves which were believed to exist within the hills but again without success. In 2001 an invitation was extended to a South African caving club, the Cave Exploration Research and Adventure Club (CERAC) to assist in the search following which a number of expeditions led by Servaas Badenhorst and Roger Ellis were conducted. However, after further exhaustive searches of the hills no new caves were discovered.

With the realisation and acceptance that no new caves with natural entrances were to be found it was recommended by CERAC that the only way to determine whether caves with no natural entrances existed under the hills was to conduct a programme of exploration drilling in the hope of encountering underground voids. To facilitate this and to give direction to the drilling team the Botswana Government initiated two gravimetric surveys over selected areas associated with the hills to identify underground anomalies which could possibly be caves. The first survey was conducted by the Botswana Department of Water Affairs in the Gcwihaba area which revealed a number of potential caves. The second survey was conducted by GRS Consulting, a South African based company, who conducted extensive surveys at both Gcwihaba and Koanaka. The survey revealed numerous anomalies at varying depths and locations which were indicative of the existence of caves.

Following these exercises, the Botswana Government engaged the services of De Wet Drilling in Gaborone to undertake a programme of drilling at selected sites identified from the gravimetric surveys. Over time numerous holes were drilled and the results analysed and although a number of boreholes revealed the existence of caves, most were filled with sand. Finally at a location close to the southern base of G2 Hill at Gcwihaba, a large void was penetrated following which the Botswana Department of Water Affairs was engaged to drill a man-size borehole to provide access to the cave. This was eventually achieved in late 2008 and in early December the newly discovered cave was first accessed by Mr Thapelo Olopeng, a colleague of Ian Khama. Realising a large cave system had been discovered, Roger Ellis from CERAC, accompanied by John Dickie, were invited to conduct the initial exploration of the new cave (initially called G2 Cave after the designation for the hill and later called Dimapo Cave) and in late December 2008 the first exploration of the cave was conducted.

The next phase of exploration drilling was conducted at K1 in the Koanaka Hills and in late 2008 another cave was discovered on the south side of the northern part of K1 Hill. The site was identified by Mr. Oaitse Ledimo of the National Museum using the GRS Consulting gravimetric survey. Once the access borehole had been drilled Roger Ellis was requested to put together a team of cavers and in early August 2009 the second borehole cave was explored (later called Gecko Chamber). During the time spent at K1 additional drill sites were selected around the western side of the hill in anticipation of further exploration drilling. However, prior to these sites being drilled Oaitse Ledimo selected another site midway along the eastern side of K1 Hill which revealed another cavity. Once again Roger Ellis and team were requested to conduct the exploration and in January 2010 the team explored the third borehole cave to be discovered (later called Fossil Cave). During the course of this expedition time was also spent down the first borehole cave at Gcwihaba (Dimapo Cave) to further explore the cave and to commence with the survey.

In April 2010 Roger Ellis and fellow caver Clint Howes were invited to return to Koanaka to direct the De Wet Drilling team in drilling further exploration boreholes around K1 Hill. The drilling company had been commissioned by the Botswana government to drill 300 metres of borehole across sites to be selected by Roger Ellis. Prior to the expedition Roger Ellis conferred with Gavin Selfe of GRS Consulting to understand the results of the gravimetric surveys and to assist in selecting the best sites for drilling the exploration boreholes. Using this knowledge and by conducting an analysis and extrapolation of known cave development depths at Gcwihaba and Koanaka, seven sites were selected for drilling using a combination of the gravimetric results and by applying cave divining methodology from which two major cave systems were discovered.

Over the course of the next year the Botswana Department of Water Affairs opened the first of the two boreholes to the newly discovered caves at K1Hill and in April 2011 Roger Ellis and a team of cavers from South Africa returned to Koanaka to explore the cave (later to be called Diviners Cave). Over the next year a number of expeditions were conducted to continue the exploration and survey of Diviners Cave. Then in January of 2012 a decision was made to open the second of the new boreholes and in April 2012 Roger Ellis and the team returned to Koanaka to conduct the

exploration of the cave (later called Mongongo Cave). For the next two years a number of expeditions were conducted to complete the exploration and survey of Mongongo Cave and continue with the exploration and survey of Diviners Cave and Dimapo Cave.

In early 2015 a decision was made to drill 1m diameter access boreholes into Dimapo Cave, Diviners Cave and Mongongo Cave in order to provide easy access for future visitors to visit the caves. In May and June 2015, Roger Ellis and Gerhard Jacobs were at Gcwihaba and Koanaka to identify the exact drill sites for the 1m boreholes and De Wet Drilling were commissioned to drill the boreholes. During the course of this expedition further sites were identified for exploration drilling and two additional caves were discovered, one at K1 Hill called Nqumtshaa Cave and one at Gcwihaba called Motswantsweng Cave which lies on the sameas the ! WaDoum Cave. Neither of these two boreholes was enlarged to gain access to the caves.

The drilling of the 1m diameter access boreholes continued through to October 2015 when all three boreholes were completed. Thereafter a process of design and development for the engineering requirements for the development of the caves for tourism followed. Designs of the capsules to enter the caves and the gantry and winch for lowering and raising the capsule were completed and the equipment manufactured by De Wet Drilling. The construction of the concrete landing platforms for the capsules at the bottom of the boreholes inside the caves also took place in preparation for the next phase of development, the construction of the winch houses at the surface. As the Gcwihaba Cave was to be the first cave to be opened for general tourism, in November 2017 a staircase was installed at the southern entrance of the Gcwihaba Cave to facilitate easy access and in March 2018 an assessment of the requirements for further development in the Gcwihaba Cave was conducted and a study of the bat population of the cave was done in conjunction with a lighting company in preparation of a lighting proposal for the cave.

Exploration programmes to discover and describe these caves have increased gradually over the years. The explorations have yielded a significant number of new finds since the first reported discovery of Gcwihaba Cave by Mr. Martinus Drotsky in 1932. The exploration and investigation project sponsored by the Botswana Government initiated in 1992, named the Gcwihaba Caves Project, has yielded significant finds over the years. The project has been multi-facetted in its approach to discovering and exploring new caves which has had some negative impact on both the surface terrain and within the caves themselves. However, when considering this aspect, it is important firstly to take into consideration the purpose of the project before making an assessment on any negative impacts that occurred during the process.

**Early works and progression**

At the time of the discovery of the three new caves at Gcwihaba and Koanaka by R. Ritter et al, it was evident from the nature of the hills and their physical appearance that other caves with no natural entrances could well exist below the surface of the hills and in an attempt to dig open an entrance numerous sites were excavated by hand across the Gcwihaba and Koanaka hills in the hope of achieving a breakthrough. These digs were first conducted by Ritter et al and later by the BDF in areas which seemed most likely to produce results. Explosives were later used at two sites on G2 Hill at Gcwihaba to crack rocks during one of the digging operations by the BDF. Beyond that occasion no explosives were used in the course of the digs and there has been no physical damage to any of the actual caves through blasting. The digs created localised destruction to the hillsides which are still evident today although by a process of natural rehabilitation through wind and rain and re-establishment of the vegetation, the digs are becoming increasingly difficult to locate.

In the Gcwihaba Cave, excavation work was conducted inside the southern entrance with the dual purpose of combining both research and the search for a potential extension to the present cave. During the course of the excavations, it was hoped to achieve a link to a known cavity accessed by drilling at the bottom of a borehole which lies approximately 168m to the southeast. The excavation process was conducted solely by hand with the material that was removed thoroughly searched for fossils and artefacts by the National Museum prior to being taken to the surface. The excavation work extended the cave by an approximate 50m but work ceased before any connection to the cavity at the bottom of the borehole was achieved. A number of fossils and artefacts were discovered and are held by the National Museum in Gaborone.

Later it was realised that the only means of confirming the existence of caves with no natural entrances was by a process of exploration drilling which led to a degree of surface contamination from the drill tailings which have largely dissipated over time. Those areas of tailings that are still evident are easily removed by being buried or

covered by the natural sand of the area. Areas of disturbed rocks moved during the drilling process are evident but can be either used for future infrastructural requirements or buried in the sand. The natural vegetation of the area is quick to re-establish and cover disturbed areas with little to no evidence left behind.

During the process of exploring the new caves that were discovered by Ritter et al, every precaution was made to minimise any negative impact on the caves. The same philosophy was applied by the South African and Botswana cavers during the exploration and surveying of the new caves that were accessed by drilling. Once designated routes had been established through the caves themselves and strict adherence to using the routes was applied. During the course of scientific research only a minimal amount of material was taken for the purpose of analysis and where engineering requirements were necessary to improve access through the caves specific consideration was given to minimizing the negative impact on the cave environment.

The opening of the borehole caves by drilling immediately introduced outside air into the caves thus affecting the internal atmosphere with the long-term consequence of slowly drying out the caves and having a negative effect on the fauna of the cave and the growth of speleothems. To counter this undesirable effect the boreholes are kept sealed and in the operational phase, once the winch house and reception buildings have been constructed over the boreholes and the capsules are in place to convey visitors in and out of the cave, it is planned to have an airlock system installed for when the capsules are not in use to minimise the degree of air exchange.

As the understanding of the cave systems grew it became increasingly evident that some of the systems were interconnected although passages which once connected the caves and had become blocked by the ingress of aeolian sand from the surface. From this realization it was evident that by a process of manual digging, connections between the caves, and potentially to new unknown extensions to the caves, could be established. This first connection was made from the North Canyon in Diviners Cave to Nqumtshaa Cave (29m). The second connection was made from Nqumtshaa Cave to Madusa Chamber (35m). The third connection was made from Madusa Chamber to Tselakgopo Chamber (60m) and finally from Gecko Chamber to Tselakgopo Chamber (20m). The combination of these digs has turned the Diviners/ Tselakgopo/Gecko Chamber System into a unique and otherwise unmatched cave system. Other digs in Fossil Cave and !WaDoum Cave have commenced and are continuing. These digs cannot be described as destructive as no damage is done to the natural cave and only alien material is being removed to achieve the connections.

**What the future holds**

The Gcwihaba Caves Project is undoubtedly one of the most unique caving projects ever undertaken. The concept of developing known caves with natural entrances for tourism while discovering new caves only accessible down a borehole is unknown elsewhere in the world. The caves coupled with the Kalahari landscape and the rugged isolated dolomite hills located in one of the most remote areas of the world, makes for a very special experience for any visitor. The Gcwihaba Cave Park will also offer game drives, walks with Bushmen, nature trails and tours of fossil sites. The caves with natural entrances offer the visitor a classic cave tour while the 'borehole caves' offer the adventure tourist an opportunity to experience the thrill of descending into the caves via a capsule while dressed in caving attire and viewing the cave as seen by the first explorers. Within the cave subtle lighting progressively switching on and off through the tour will provide glimpses of unique features of the cave and provide an aura of mystery and excitement.

The Gcwihaba Cave Park, while still in the process of development is destined to occupy a special niche in Botswana's tourist industry and is expected to attract visitors from all over the world. The Park will also feature a lodge with game viewing platforms and an authentic Bushman village where the local Basarwa people will entertain guests with tribal dances and provide a taste of local food and beverage. Botswana is internationally renowned for its wildlife parks and reserves and the Gcwihaba Cave Park will no doubt become a favoured destination. The Park will offer employment for the local Basarwa and Herero communities and revenue from the park will assist in subsidizing the services they need in this remote but beautiful areat of Botswana.

**The story unfolds**

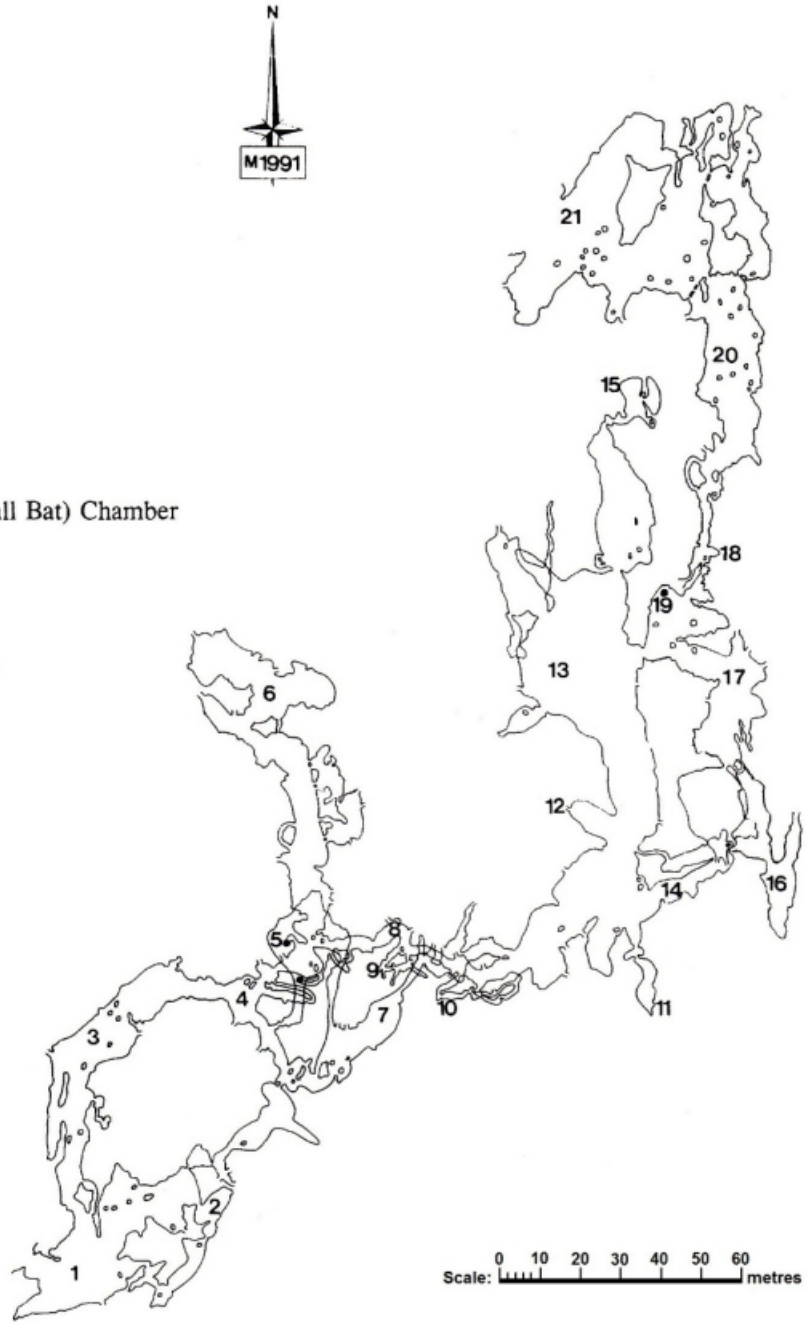
The story of the Gcwihaba Caves Project cannot be told in just this presentation, the challenges, the thrill of discovery, the evolution of the sciences applied, the euphoria of conquest, the beauty revealed, the failures, the disappointments, the danger, the near-death experiences, the camaraderie, and the everlasting bond of brotherhood that evolved from a common purpose by all those involved cannot be described herein.

# Gcwihaba Cave

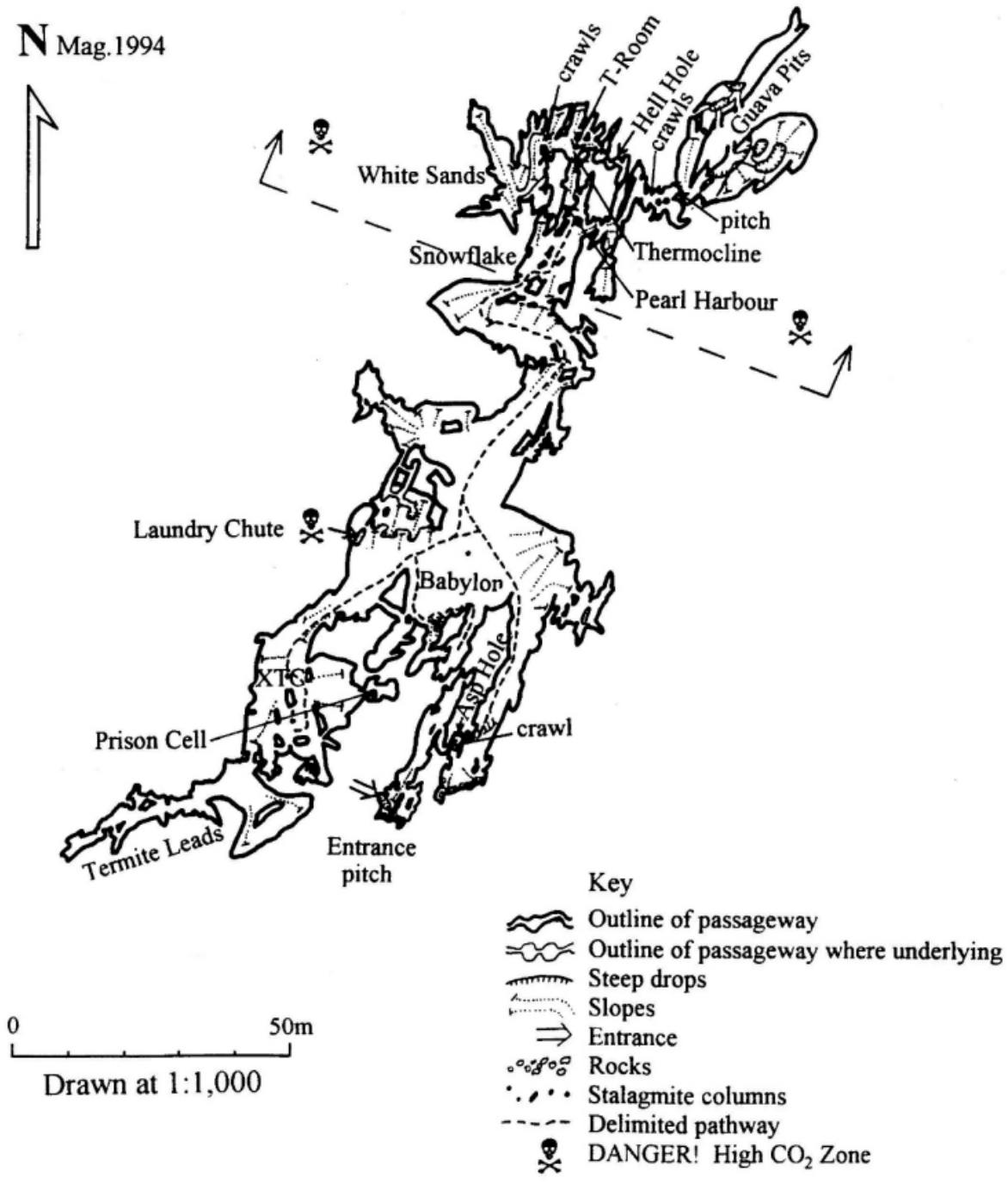
## Plan View

**Passage Names**

1 South Entrance Hall
2 Ice Castle
3 Graceland
4 Central Junction
5 Belfry
6 Far Side
7 Upper Passage
8 Lower Passage
9 Ripping Crawl
10 Catapult
11 Gas Chamber
12 Dante's Inferno
13 Drotsky's Hall
14 Hairpin Slide
15 Sonar
16 MOAB (Mother of all Bat) Chamber
17 Dragon Head
18 Rope Pit
19 Hoover Bag
20 Enchanted Forest
21 North Entrance Hall

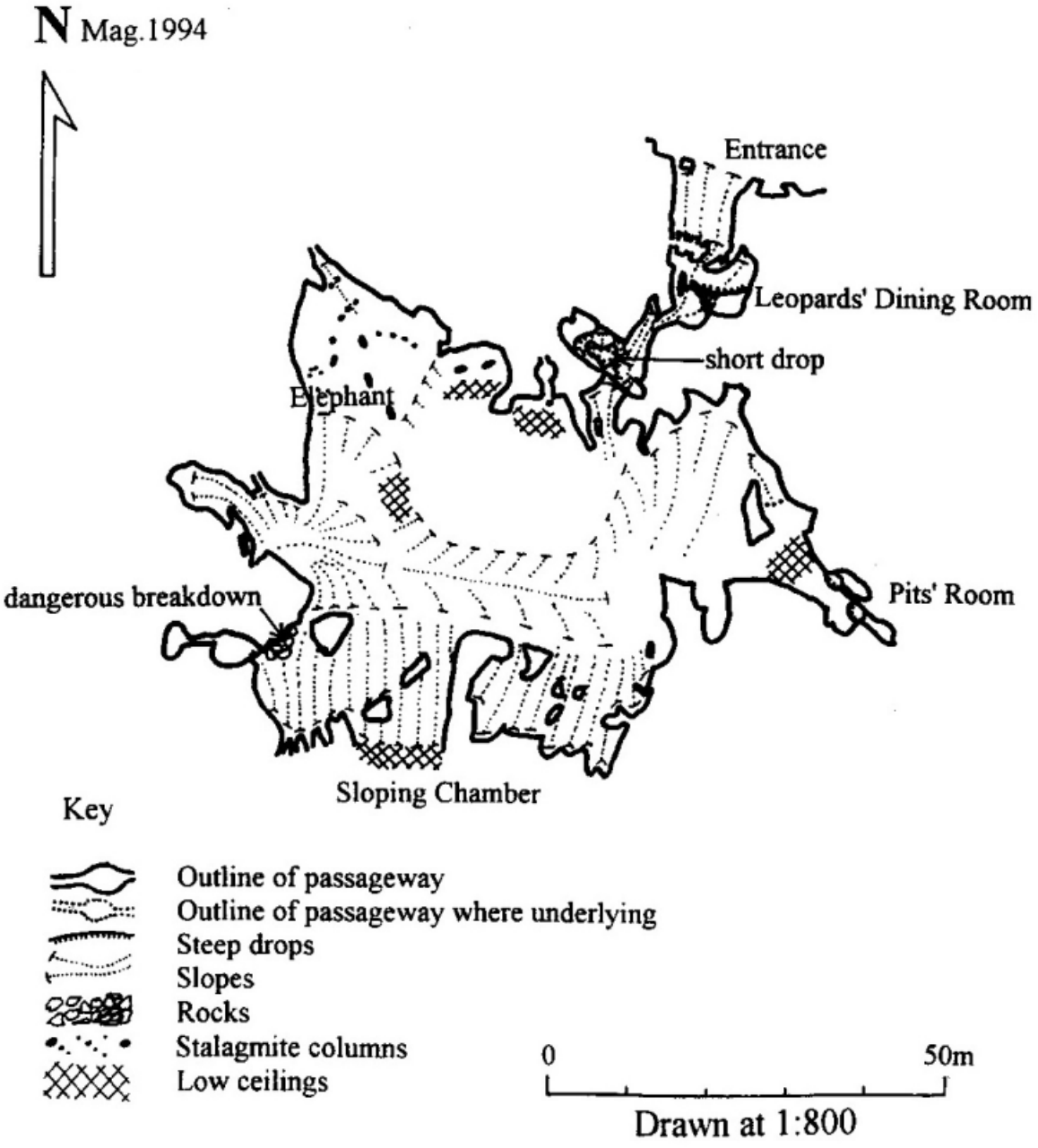


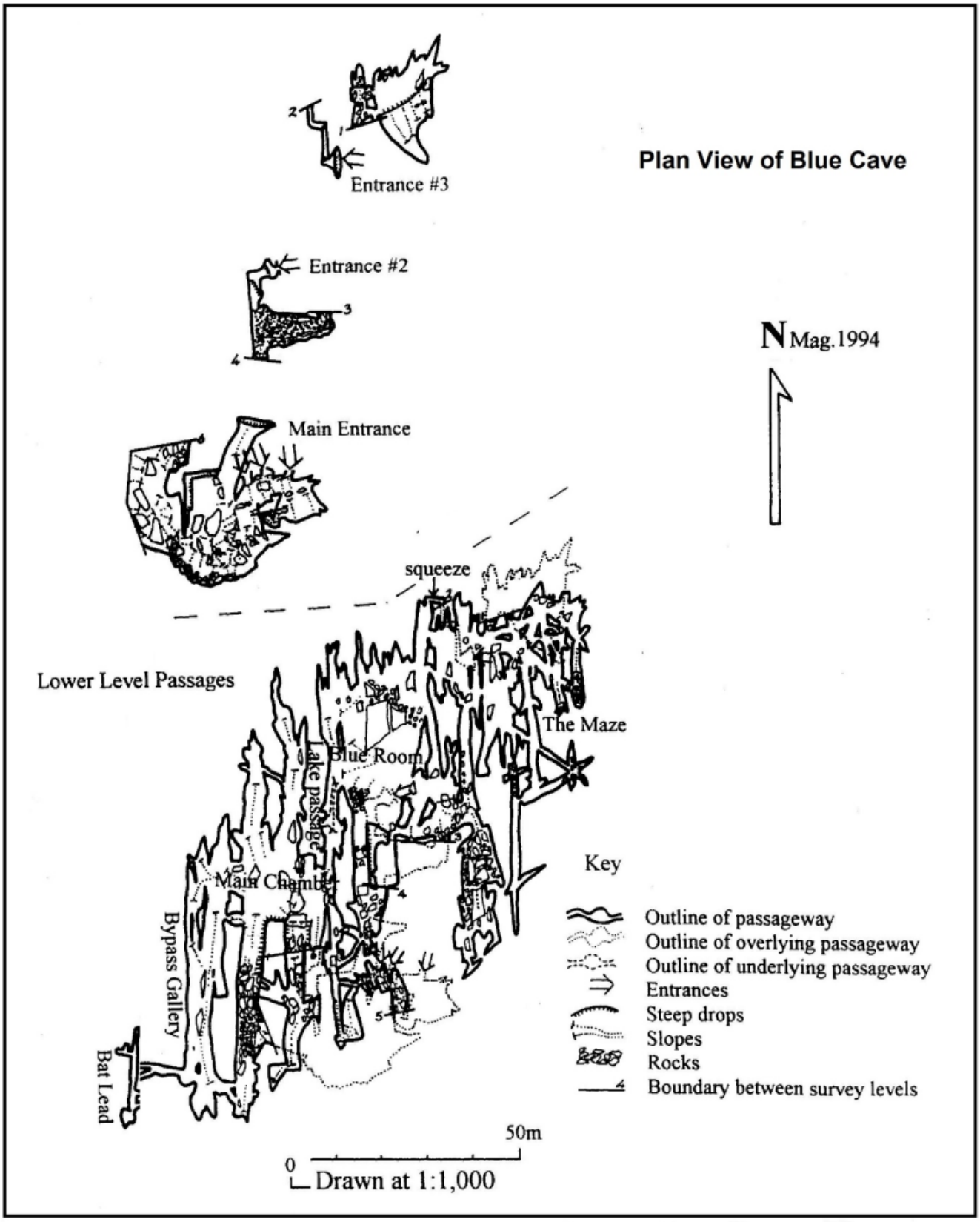
## Plan View of !WaDoum Cave




Survey processed and drawn by Paul Mann

**Plan View of Bone Cave**




Plan View of Blue Cave
Entrance #3
Entrance #2
N Mag.1994
Main Entrance
squeeze
Lower Level Passages
The Maze
Blue Room
Lake passage
Main Chamber
Bypass Gallery
Bat Lead
Key
Outline of passageway
Outline of overlying passageway
Outline of underlying passageway
Entrances
Steep drops
Slopes
Rocks
Boundary between survey levels
50m
0
Drawn at 1:1,000

# Surveying the Confidence Reef Mine

By Rod Kruger

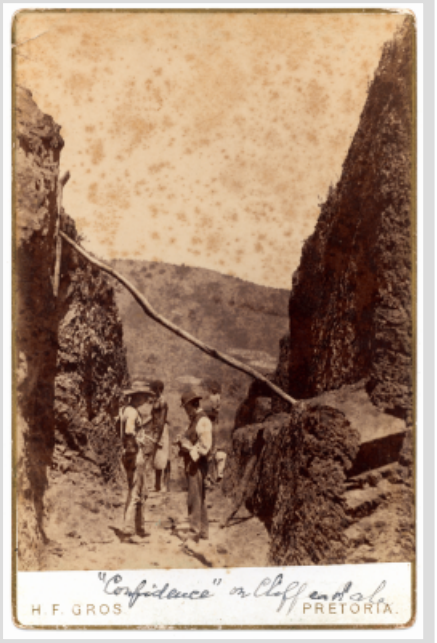
While exploring the Witwatersrand in 1884, Fred Struben discovered what he considered was a payable series of gold bearing reefs. The first promising area was north of Krugersdorp, near the present Sterkfontein Hospital. Mining was begun in co-operation with his brother Harry, and with two partners they formed the Sterkfontein Junction Mining Syndicate.

However, the gold, plentiful on and near the surface, pinched out at about 15 meters. The mine was abandoned.

Searching further to the East, Fred again found a good deposit on Wilgespruit, a farm then owned by Louw Geldenhuys.

Mining began on a koppie on the South East side of the farm. In his diary, Fred Struben wrote that he was finding a grain of gold for every grain of sand. His big brother, Harry, ever the poet and businessman, named it the Confidence Reef Mine.

Mining continued by the Strubens and a couple of hardy Zulus until 1888, when the Strubens let the mine out (possibly to a French Nobleman named Count Jacques De Waru) and retired to Cape town.




*Left to Right - Fred Struben, Zulu workers, Harry Struben at the Confidence reef mine 1885. Photo by Henri Fredinand Gros.*

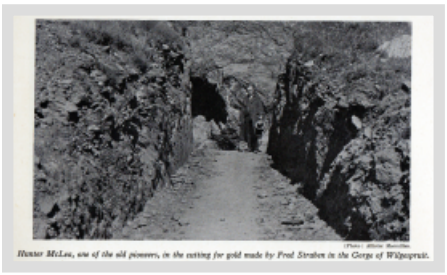

*Louw & Emmarentia Geldenhuys. Photo in Kimberley by E.F. Robertson.*

Sporadic mining continued at the Confidence Reef, mostly by a Man from Roodepoort, George Brown. Brown also began mining further south and maps as recent as 1955 show his Browns Mine near Horizon, Roodepoort.

A photograph of the entrance to the mine appeared in the 1925 Rand Daily Mail newspaper. It showed the Rand Daily Mail Editor, Hunter Mc Lea, guided to the mine by Godfray Lys, who had helped his uncles with their mining, and now came to show the newspaper editor where the mine was located.

*Strubens-George Brown mining in Kloofendal. 1935 - The Star Newspaper*

This photo shows only one entrance to the mine. Photos taken later, show two. The oddly shaped entrance is mostly attributed to Brown, but many miners working on the big Main Reef mines came to do a bit of illegal mining on weekends etc.

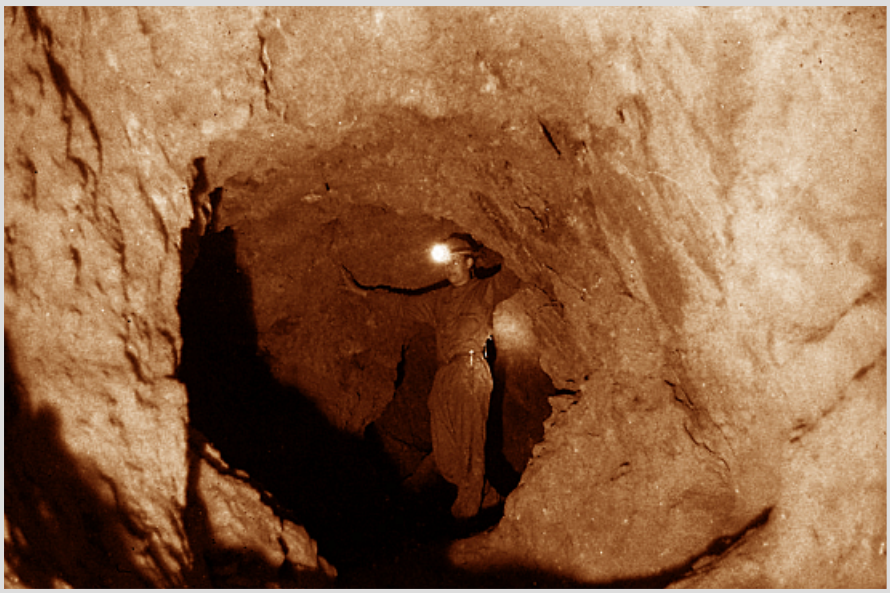


During 1966, the author, Rod Kruger and his friend Douglas Sinclair, being of an adventures frame of mind, explored all these old shafts and drives underground. Some of my photos appeared in the local West Rand Times.

*Entrance to the Confedence Mine, 1966. Deep shaft on left, Sub-shaft on right. Photo by Rod Kruger 1966*

Today the mines are located in Kloofendal, the Afrikaans equivalent of Cliff and Dale, Harry's name for the portion of Wilgespruit which he bought.

They are fenced and gated off and the public only has limited entrance on



*Deep in the Confidance Reef mine, Doug Sinclair explores. Photo by Rod Kruger,1966*

conducted tours.
In 2023 massive floods caused a large landslided in the mine Adit just in front of the two mine entrances. Eighty eight tons of mostly soft Iron slate were removed from the mine by Friends of Kloofendal's Dr. Steve Spottiswood and hired labour.

Historian and tour guide Rod Kruger (me, the same man as in 1966) began conducted tours to the mines in 2009. It worried me very much as to what the condition of the mines were underground after the floods, and that no modern survey had ever been carried out on them.
A month ago, I spoke to the Speleological exploration club of Witwatersrand, who's members came and did a quick visual survey to check the condition of the two mines. They were satisfied that conditions were safe enough to carry out a survey.

Then on Saturday 28th July 2025 a team of three men, Teaghan Stoop, Dirk Van Rooyen and Steven Tucker plus myself, Rod , descended into the two Confidence reef mines, plus several other shafts within the enclosed area. A detailed survey was undertaken using measuring instruments for cave survey. This gave me the opportunity to photograph the mines in detail.
The "newer" western mine proved to be quite small, with an entrance gallery easily accessed by tourists, and

*Exploring and survey of western or newer mine*

*Exploring and survey of western or newer mine . Rod Kruger*

a vertical shaft of about 7 meters depth, gated off. At the bottom of this shaft, about 2 meters square, was debris consisting of old logs, tins and rubbish, and a very old 10 litre paint tin with had many pick axe holes and was used as a charcoal brazier for

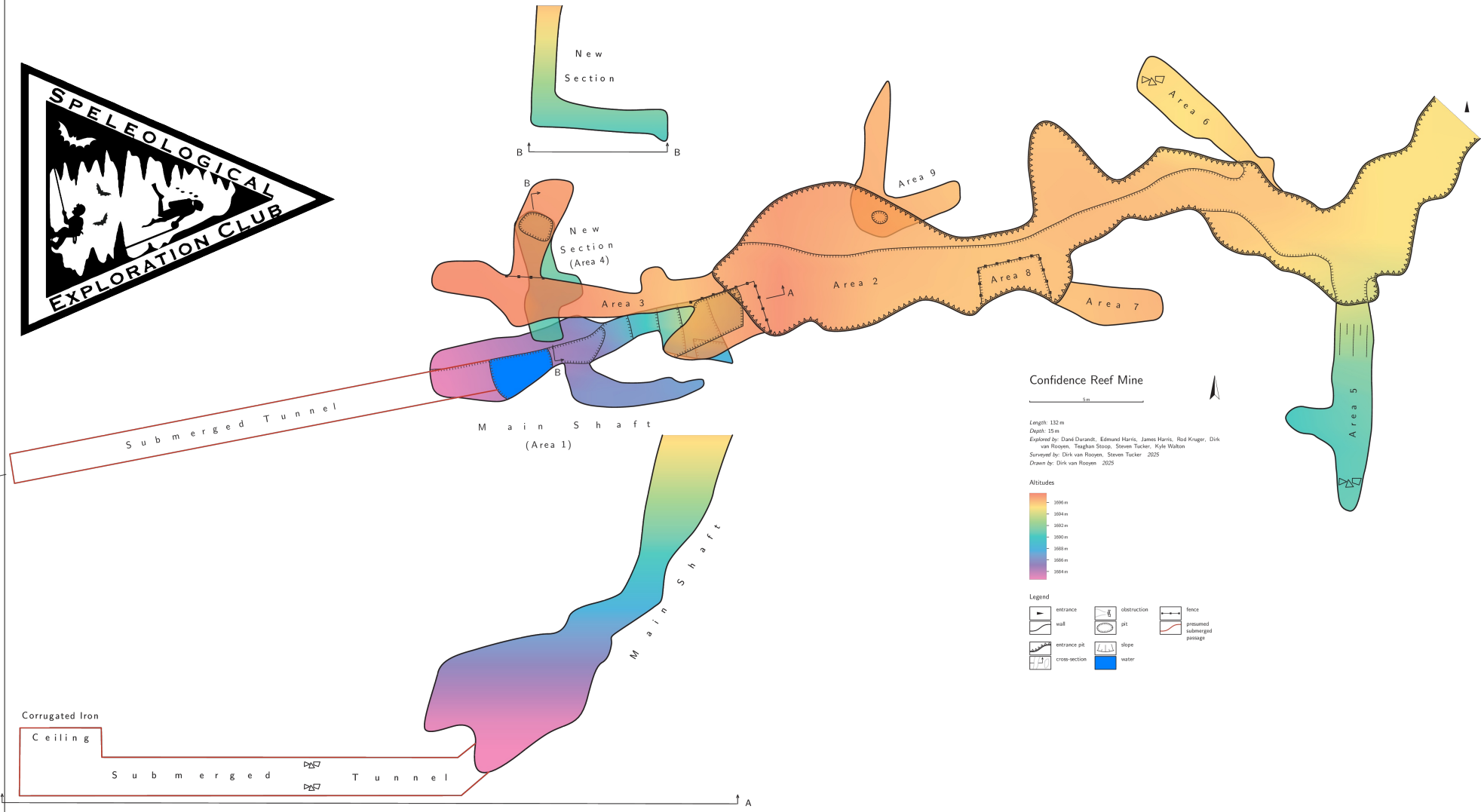
heat, probably by the original miners.

The mine tunnelled off eastwards for about two meters and dipped about one meter. There were a lot of stone chips from manual digging into soft iron mud and a shist of a pearl grey and blue appearance. This shist also was largely present in the walls of the tunnel.

The original Struben Confidence Reef mine was relatively easy to access but gated off at surface. A steep incline shaft with a twist in it near the bottom gave way to a large shelf and what should have been the entrance to the drive or tunnel. Alas, during the big storm three years ago, a large mass of rock, mostly iron shale and water had poured down the shaft between the bars of the gate. Indeed, if not for the gate the shaft would have been plugged solid.

The top of the tunnel just showed above the rock and it was flooded to the top. If this water is still there three years later, then the mine must be very impermeable.
Sadly, no access could be made into the tunnel that I and my friend had explored back in 1966. All I can offer here are my forty year old memories, and the two photos I took there, which may prove to be the only photos of this drive ever. Nor could we do any measurements or sampling.

As I remember, the tunnel was about 60 meters long, big enough to stand upright, with an obstruction in the middle (see photos ) of either old backfill, or a small collapse. At the end of this drive was a square area like a small room, cut higher and wider than the tunnel. It had an old corrugated


SPELEOLOGICAL EXPLORATION CLUB
New Section
B
B
New Section (Area 4)
Area 3
Area 9
Area 2
Area 8
Area 7
Area 6
Area 5
A
A
Submerged Tunnel
Main Shaft (Area 1)
Main Shaft
Corrugated Iron
Ceiling
Submerged Tunnel
A
A
Confidence Reef Mine
5 m
Length: 132 m
Depth: 15 m
Explored by: Dané Durandt, Edmund Harris, James Harris, Rod Kruger, Dirk van Rooyen, Teaghan Stoop, Steven Tucker, Kyle Walton
Surveyed by: Dirk van Rooyen, Steven Tucker 2025
Drawn by: Dirk van Rooyen 2025
Altitudes
1696 m
1694 m
1692 m
1690 m
1688 m
1686 m
1684 m
Legend
entrance
wall
entrance pit
cross-section
obstruction
pit
slope
water
fence
presumed submerged passage

## Burrow Mine Hole

1 m

UISv2 Grade 4-4-EF

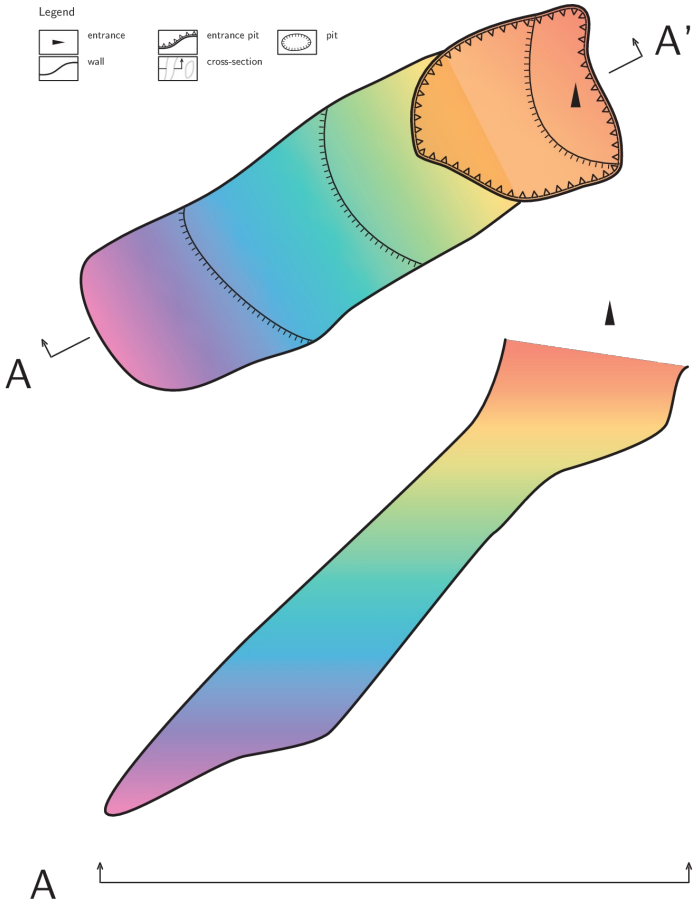
*Length:* 6 m
*Depth:* 4 m
*Explored by:* Teaghan Stoop, Steven Tucker
*Surveyed by:* Teaghan Stoop *2025*
*Drawn by:* Teaghan Stoop *2025*

Altitudes

1684 m
1683 m
1682 m
1681 m

Legend

entrance
wall
entrance pit
cross-section
pit




## Booty-Hole

2.5 m

UISv2 Grade 4-4-EF

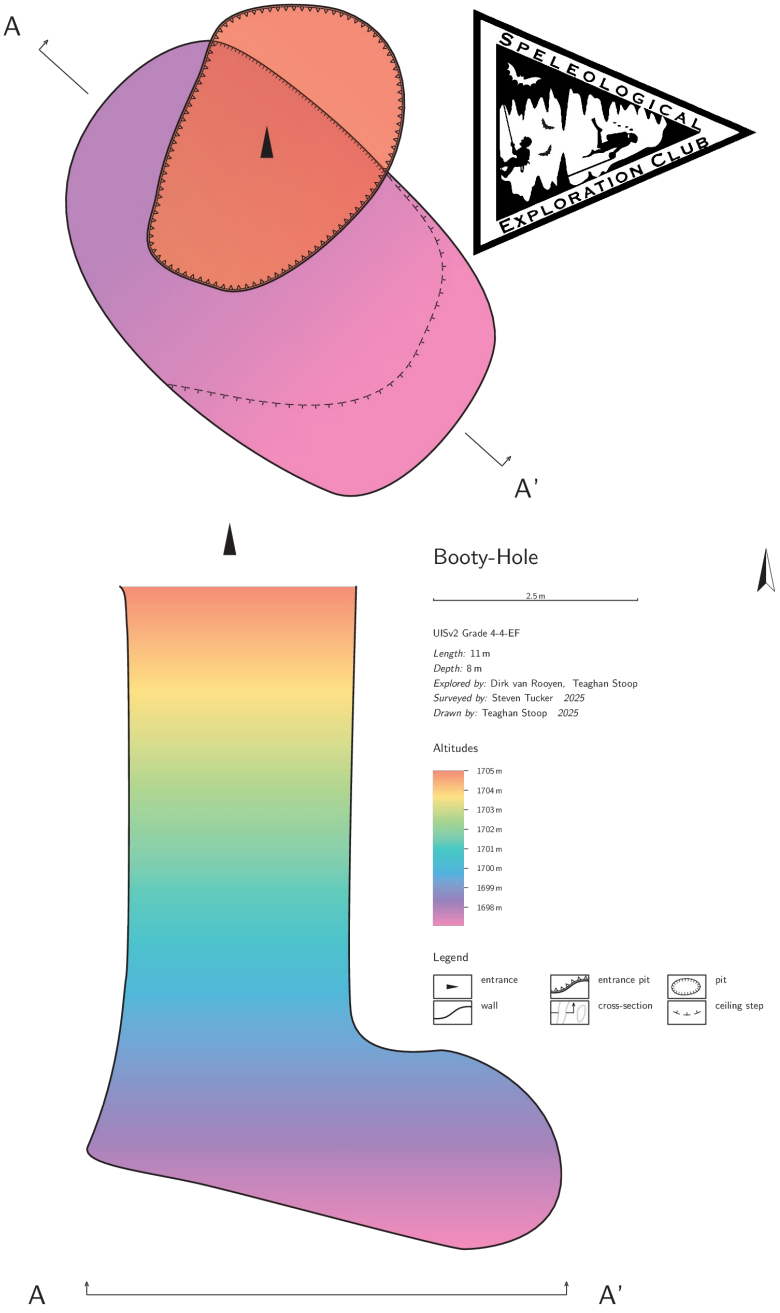
*Length:* 11 m
*Depth:* 8 m
*Explored by:* Dirk van Rooyen, Teaghan Stoop
*Surveyed by:* Steven Tucker *2025*
*Drawn by:* Teaghan Stoop *2025*

Altitudes

1705 m
1704 m
1703 m
1702 m
1701 m
1700 m
1699 m
1698 m

Legend

entrance
wall
entrance pit
cross-section
pit
ceiling step



## Hole-Y Leg

2.5 m

UISv2 Grade 4-4-EF

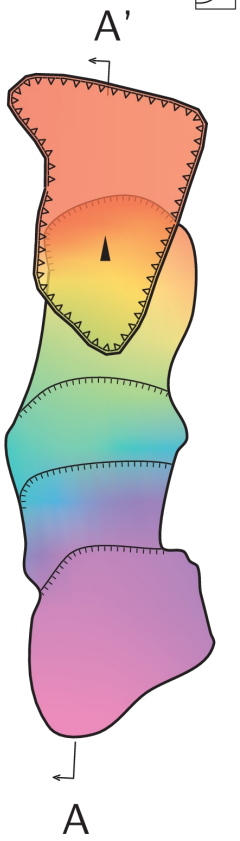
*Length:* 15 m
*Depth:* 13 m
*Explored by:* Dirk van Rooyen, Teaghan Stoop
*Surveyed by:* Dirk Van Rooyen, Teaghan Stoop *2025*
*Drawn by:* Teaghan Stoop *2025*

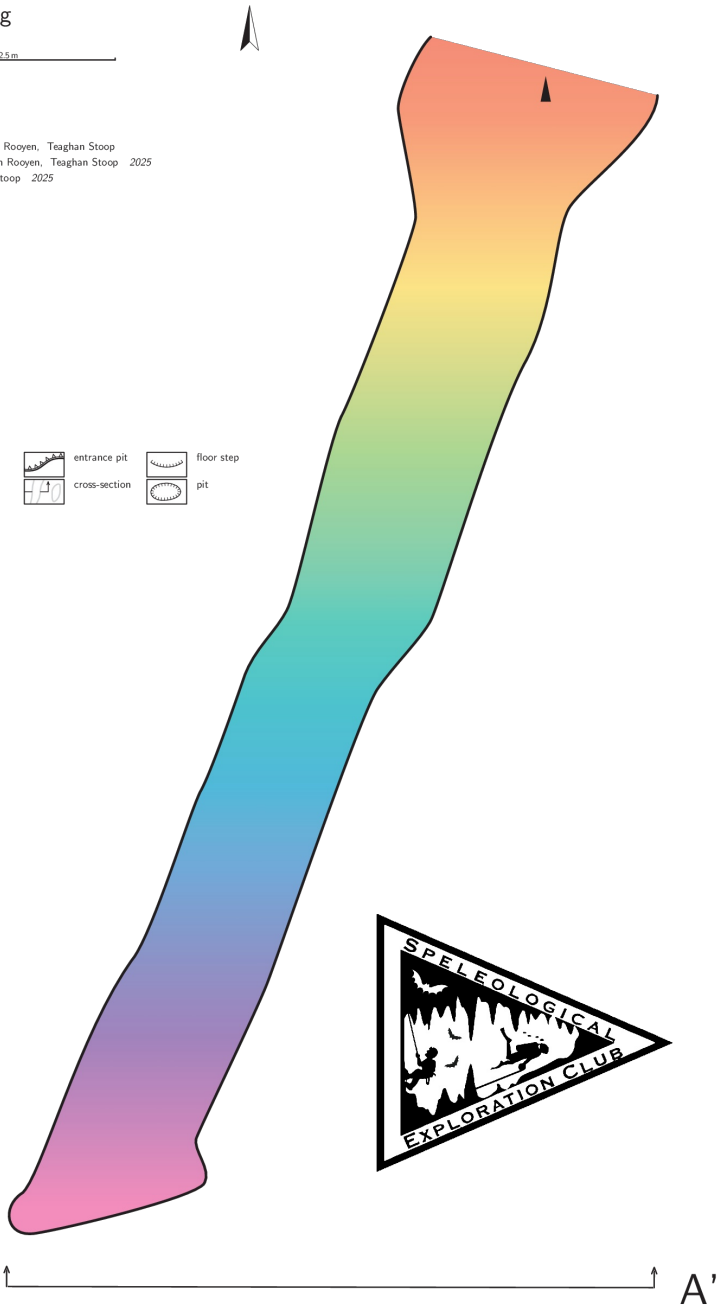
Altitudes

1710 m
1708 m
1706 m
1704 m
1702 m
1700 m
1698 m

Legend

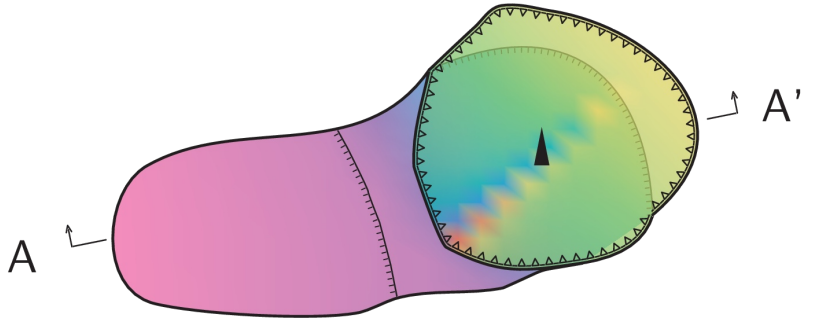
entrance
wall
entrance pit
cross-section
floor step
pit










## Rabbit's-Foot

1 m

UISv2 Grade 4-4-EF

*Length:* 7 m
*Depth:* 6 m
*Explored by:* Dirk van Rooyen, Teaghan Stoop
*Surveyed by:* Dirk Van Rooyen, Teaghan Stoop *2025*
*Drawn by:* Teaghan Stoop *2025*

Altitudes

1698 m
1697 m
1696 m
1695 m
1694 m
1693 m


Legend

entrance
wall
entrance pit
cross-section
floor step
pit

iron ceiling, most probably to prevent rock collapse but with no wood supports, unless these had rotted away.

The whole appearance of the mine suggested that Fred Struben was right when in his diary he wrote, "I was following a pipe, lost it and could not find it again. " William Cullen Library, Wits.)

Of the other shafts and tunnels in the fenced area, nothing exciting was found, all leading to dead ends and only one reaching a depth of twelve meters. All were surveyed and I hope to have the survey maps soon.

# Temple of Doom extension to Gerrie's Bathole

By John Dickie, Dawid van der Spuy and David Groenewald

**Conquering Bolt Bridge – by John Dickie – 24th January 2015**
The exploration down Gerrie's Bathole, months earlier, had been halted by a collapse and a 10 m wall. André Doussy, Gerrie Pretorius and I had set out with the rigging kit, but at the base of the pitch the previous night's partying caught up with André, and he curled up in the mud, doing nothing more. As elsewhere in Armageddon, the surfaces were either slick with clay or strewn with jagged ceiling breakdown from the "Fubarite" roof (massive fault-zone breccia). The walls were the worst rock imaginable — shattered cherty dolomite with striations of clay. It was difficult to find solid rock for bolting; there was lots of hammer work involved and many unusable holes ...

The pitch was eventually conquered. It led to the precarious traverse Bolt Bridge, a slippery gully and more rotten rock in which to bolt to return to the floor level again. We negotiated our way down slippery handline slopes and a jagged section at the top of a vertical 15m scree cliff, that showered us continuously with dirt and rocks. Beyond lay a high roofed chamber blocked by scree slopes and boulder chokes. Voids could be seen above, and a big bolting session would be needed, so it was left as a question mark until the rest of Armageddon had been explored. Years later this chamber would be named the Temple of Doom.

I had managed to leave my caving boots at home, so I was in sandals, which left blood oozing though thick mud and a very unpleasant SRT climb out, ending a rough day of exploration.

**Discovering the Extension – by Dawid van der Spuy**
The Bathole Extension Discovery - 8th of November 2020

SEC had decided to arrange a fun trip to Armageddon on the 8th of November 2020. We had been having ongoing issues with zama zamas in the area, as there are several gold mines nearby. Some of these mine shafts had been decommissioned, which we believe had led to an increase in illegal mining activity. On previous trips to Armageddon, some of our equipment had been stolen, and on one occasion we had come across ten stranded suspected zama zamas who we rescued from certain demise inside the cave.

It was against this backdrop that the trip was organised as a visitors' outing — to introduce non-members to the cave and to inspect the zip lines — as well as for a smaller, more adventurous group to go down the Bathole. The Bathole's last chamber had previously only been explored by Gerrie Pretorius.

Sixteen cavers turned up for the trip: eleven went down the main passage, while five of us — John Dickie, Selena Dickie, Thilo Müller, Herman du Plessis and me — descended the Bathole. The Bathole branches off

the main line at the bottom of Heartbreak Passage, within the Main Chamber of Armageddon. In contrast to the main passage, the Bathole is a long vertical decline with numerous slopes and rope pitches. The progress to the last known chamber was slow, as the ropes had to be rigged and only one person could be on them at a time.

When we finally reached the last chamber, everyone began poking around, looking for any possible extensions. In what seemed to me the obvious continuation of the Bathole, there was a dodgy scree-slope passage made up of loose rock and sand. At the top of the slope sat a massive loose boulder, about the size of a car, which shifted ominously with every step as the rocks and sand moved beneath it. It almost deterred me from climbing further, since the top appeared to be a dead end, but I decided to persevere anyway. Keeping a close eye on the boulder, I managed to edge past it and then kicked it down the slope to prevent it from being a future hazard. That passage became known as Indiana Jones Passage, and the chamber as the Temple of Doom.

At the top, I confirmed it was indeed a dead end and called back to the others. As I started making my way down again, I noticed a small drop-off on the left-hand side of the slope. I climbed down into it and saw what looked like a possible continuation above me. I had to enlarge the hole by carefully moving rocks out of the way — some of which fell beside or onto me as I worked — but eventually managed to squeeze through. Awkwardly clambering upwards a few metres, I suddenly found myself in a brand-new section of the cave!

I was overwhelmed with a feeling of pure ecstasy as I realised I was standing in untouched, virgin passage. The new tunnel stretched in both directions as far as my light could reach, with the roof soaring about 25 metres above and the walls roughly 6 metres apart. White bands streaked through the black rock of the roof, inspiring the name Milky Way Passage. This was a fault line clearly visible on the roof.
I could barely contain my excitement and quickly made my way back to fetch the others. I managed to convince only Herman and John to return with me. We followed the new passage for about 70 metres before reaching a 7-metre-high wall that would need bolting. Shining our lights upward and beyond, we could see it continued far further, and we knew we'd have to come back with a bolting kit as soon as possible.
We exited the cave elated and shared the news of our discovery with the others. Knowing we'd be returning soon, we left all the ropes and rigging in place. The date was set for our return — two weeks later, on the 21st of November.

**The rescue – 21st of November 2020**
On the second trip, we were a small group of intrepid cavers ready for a long push. John and Steven Tucker went down first, moving as fast as they could to reach the wall that needed to be bolted. JP Janse van Rensburg and I followed next, with Herman and Jenkins Gregory bringing up the rear.

JP and I caught up with John and Steven, who were busy bolting. This was immediately followed by a 5 meter abseil which was also bolted. From here Steven started to survey the cave whilst we pushed ahead. About 60 metres later we met with a 4-metre pitch up and then a traverse, all of which needed to be bolted. Shortly thereafter we had to rig a 7-metre pitch down a narrow shaft. Another 60 metres later and we faced a traverse, in a narrow tunnel over a 20-metre drop. We called it a day.

Sometime during this exploration, Herman had arrived — alone. When we asked where Jenkins was, he told us Jenkins was waiting at the Temple of Doom. Apparently, there had been an incident, but Herman assured us Jenkins was fine when he left him, so we continued exploration and surveying.

We only learned the full story later. Jenkins had gone down the wrong side of the drop into the Temple of Doom and had dislodged a rock above him, which had struck him on the helmet whilst he was still on rope.

When we reached Jenkins, we realised the situation was more serious than we'd thought. He was weak and disorientated. His mind was playing tricks on him, and he was terrified, convinced he wouldn't make it out. He said there was no way he could climb out and that he would need to be rescued. We had a serious discussion about what to do next. One option would be to bring him warm clothing, let him rest for the night to regain strength, and try again the next day. Rescue was considered, but John said that a rescue from this location would take days, and it would be best if he tried to get himself out with assistance. With a lot of reassurance, we managed to get him up and over Bolt Bridge, but this was excruciatingly slow. We rested after the bridge for a while. At this point John and JP went ahead to exit the cave and let others know what had happened. Steven and Herman went up the next pitch to assist from above whilst I stayed with Jenkins.

I was able to get him to eat and drink some Coke, though he wasn't keen due to the nausea. After some food, fluids, and a bit of encouragement, I worked to keep his spirits up — distracting him from the fear and the tricks his mind was playing on him. Bit by bit, I convinced him to start moving — one step at a time. Slowly but surely, we began making


our way to the next pitches.

When we reached the rope sections, I let Jenkins go first, helping him get onto the rope and guiding him from below — telling him where to place his feet and in what order to work his SRT gear, since he wasn't in the right headspace for managing it on his own. Once we were up these last pitches, Steven left to exit the cave and help others re-rig the entrance for a haul.

As we moved through the cave, Jenkins kept saying how scared he was — even in the flatter sections — and that he felt like the cave was going to open up and swallow him whole.

Meanwhile, on the surface, some of the cavers had exited and started making plans. My wife received a call from Selena, who unfortunately began the conversation with, "Something happened today at Armageddon." Hearing the concern on the other end, Selena quickly added that nothing had happened to me — but that I might not be coming home that night, as I'd be spending it in Armageddon with Jenkins. Eventually, Jenkins and I reached the bottom of the entrance sinkhole, where the others were waiting to haul us out. He and his family were deeply grateful to all of us who helped rescue him that day. I haven't seen Jenkins in a cave since.

We reached a depth of 254 m — just shy of the known deepest point in the main passage at 259 m — and extended the Bathole by another 250 m, bringing the total known length to approximately 350 m.

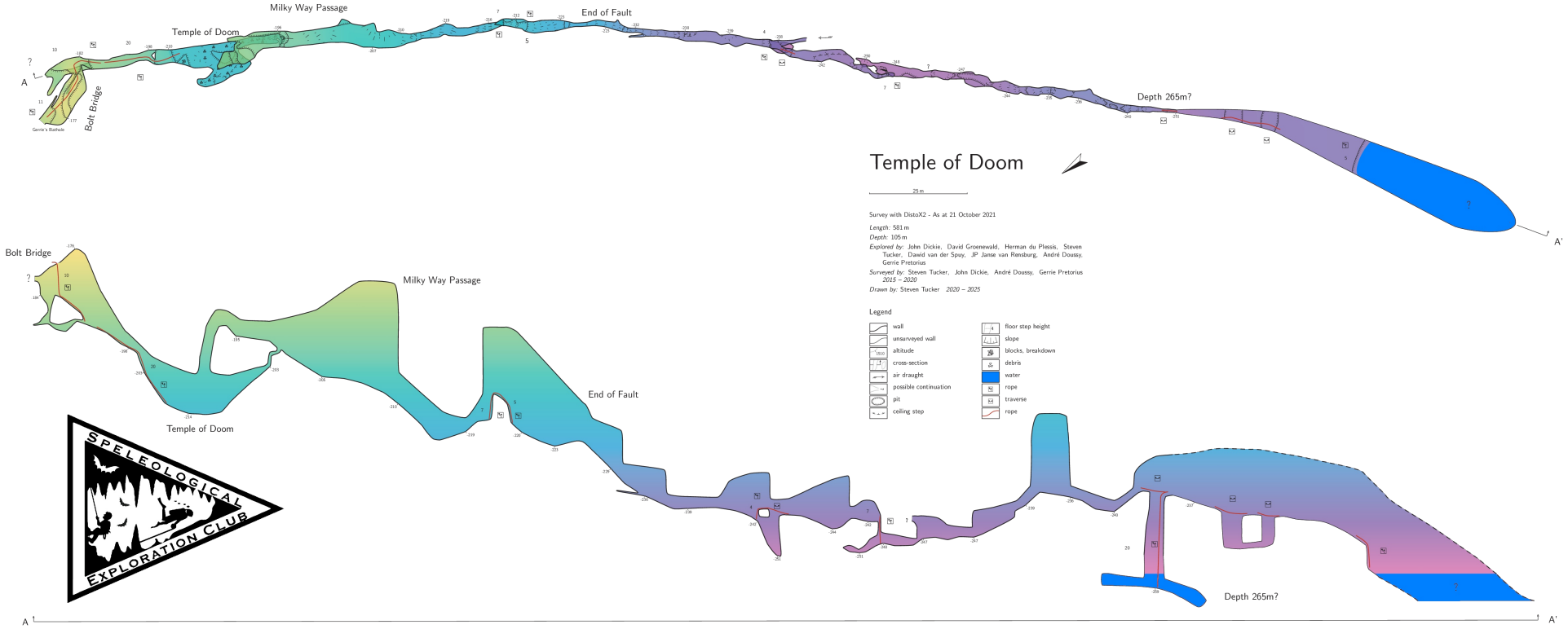
**The Deepest Section - 29th of November 2020**

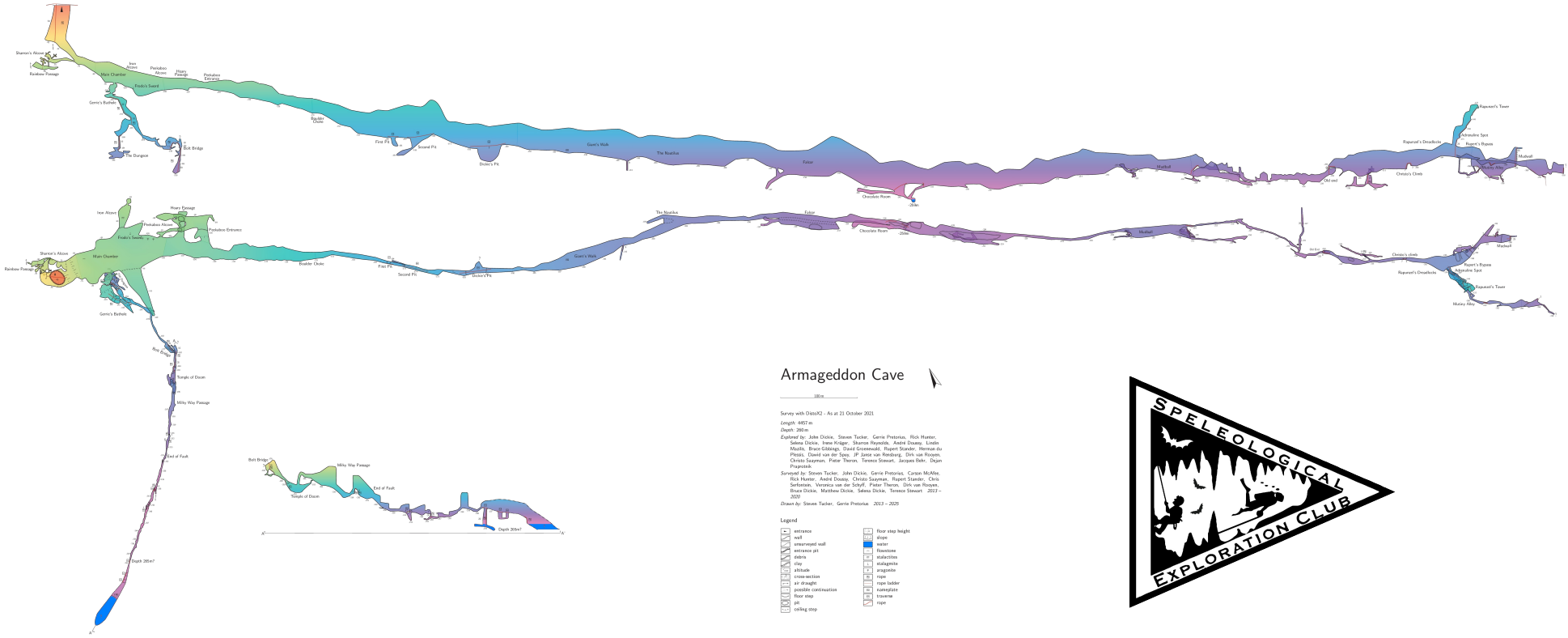
On the third trip, a deeper section was reached. John, Selena, JP, Steven, Annette Kruger, Herman and I were on this trip. This extension of the Bathole seemed to follow a pattern — long pitches roughly 5-metres across and about 10 to 20-metres deep. The obvious continuation of the cave could usually be seen across from these pitches, which meant bolting along the side and traversing across to reach it.

Most of these pitches were never descended, and exploration opportunities remain if water levels drop and allow for return visits. While traversing across one of them — and being one of the heavier cavers on the trip — I broke the ledge I was standing on and fell about a metre, catching myself on my cowstails and unintentionally drop-testing newly placed bolts over a 20 m void. To this day, it remains one of the scariest moments I've ever had while caving.

In total on this outing, we abseiled or climbed ten pitches on rope and crossed three pits. Of course, all of this had to be done heading back – then mostly going up. While Steven was busy with the bolting, JP went down one of the pits and reached an estimated depth of about 265 m — making it the deepest part of Armageddon. The bottom of this pit was a few centimetres underwater, which we believed to be at the level of the water table.

The trip took around 12 to 14 hours in total, leaving little time for further pushing or exploration. By this stage, most of the SEC cavers were no longer physically able to take part in such long and demanding


Milky Way Passage
Temple of Doom
End of Fault
Bolt Bridge
Depth 265m?
A
A'
Temple of Doom
25 m
Survey with DistoX2 - As at 21 October 2021
Length: 581 m
Depth: 105 m
Explored by: John Dickie, David Groenewald, Herman du Plessis, Steven Tucker, Dawid van der Spuy, JP Janse van Rensburg, André Doussy, Gerrie Pretorius
Surveyed by: Steven Tucker, John Dickie, André Doussy, Gerrie Pretorius 2015 – 2020
Drawn by: Steven Tucker 2020 – 2025
Legend
wall
unsurveyed wall
altitude
cross-section
air draught
possible continuation
pit
ceiling step
floor step height
slope
blocks, breakdown
debris
water
rope
traverse
rope
Bolt Bridge
Milky Way Passage
Temple of Doom
End of Fault
Depth 265m?
SPELEOLOGICAL EXPLORATION CLUB
A
A'


Shamor's Alcove
Rainbow Passage
Main Chamber
Iron Alcove
Pinkaboo Alcove
Hoary Passage
Pinkaboo Entrance
Freda's Sweets
Gemi's Bathole
The Dungeon
Bolt Bridge
Boulder Choke
First Pit
Second Pit
Diver's Pit
Gael's Walk
The Nautilus
Falsie
Chocolate Room
-20m
Mudwall
Old end
Christo's Climb
Rapunzel's Dreadlocks
Rapunzel's Tower
Adrenaline Spot
Rupert's Pypons
Mukatz Alley
Temple of Doom
Milky Way Passage
End of Fault
Depth 265m?
Armageddon Cave
180 m
Survey with DistoX2 - As at 21 October 2021
Length: 4497 m
Depth: 260 m
Explored by: Jake Dickie, Steven Tucker, Gerrie Pretorius, Rick Hunter, Selena Dickie, Irene Krüger, Sharnos Reynolds, André Douesy, Lindin Maulis, Bruce Gibbings, Dawid Greeneveld, Rupert Stander, Herman du Plessis, Dawid van der Spuy, JP Jonie van Rensburg, Dirk van Rooyen, Christo Saayman, Pieter Theron, Terence Stewart, Jacques Behr, Dejan Prapcinsk.
Surveyed by: Steven Tucker, John Dickie, Gerrie Pretorius, Carson McAfee, Rick Hunter, André Douesy, Christo Saayman, Rupert Stander, Chris Serfontein, Veronica van der Schyff, Pieter Theron, Dirk van Rooyen, Bruce Dickie, Matthew Dickie, Selena Dickie, Terence Stewart 2017 – 2020
Drawn by: Steven Tucker, Gerrie Pretorius 2013 – 2025
Legend
entrance
wall
smearwayed wall
entrance pit
debris
clay
altitude
cross-section
air draught
possible continuation
floor step
pit
ceiling step
floor step height
slope
water
flowstone
stalactites
stalagmite
aragonite
rope
rope ladder
nameplate
traverse
rope
SPELEOLOGICAL EXPLORATION CLUB

adventures. As a result, it would be a few more months before the next descent into the Bathole was undertaken.

**The Final Trips – by David Groenewald**
Bolting - 21st of April 2021

The next trip took place on the 21st of April 2021 and was a small party consisting of only John and myself. The exhausting experience of going in and out put off other takers and there were no volunteers for the trip. The only part of the Bathole I had previously been to was the Dungeon and this trip was my first time going over Bolt Bridge. The incredible mold growing on the wooden planks and poles at the start of the Bathole is fascinating.

After a few hours we eventually reached the pit where Steven had stopped bolting, partly due to the rotten rock. The pit itself is not very wide — only about five or six meters across — and Steven had made it roughly halfway. Looking down, we could see a second pit on the far side, linked to the first by a tunnel.

While it is possible to descend into the first pit and walk to the end of the second, the wall is unstable and crumbly, so traversing around it was the safer option. I placed an additional four bolts to enable the crossing, though only two of these will be used for future crossings. The first two bolts were placed on better rock lower down and allowed us to cross initially. Once on the other side, I added two new bolts on decent rock higher up, which kept the traverse easier and more level.

At this stage, progress was slow, as bolting had to be done with one's left arm. I was also at the end of the rope and had used up all the bolts I had carried across. Looking at the wall of the second pit, we concluded that it was possible to continue bolting, but that would need to wait for a return trip. We then headed back, confident that the second pit could be crossed without too much difficulty.
On the way out, I went down a small pit on the floor below the crawly traverse to the water table. It was first explored by JP in 2020. The descent itself is not great because the edge is very loose and crumbly, and the rope lies against this. As one descends, one pulls down quite a lot of material, including larger rocks. Abseiling is safer, provided you maintain a smooth rather than jerky descent, but on the way back up one must be very careful of all the loose material pulled down on oneself while SRTing up. A redirect should be installed if people want to go down this in future.

The extension still needs to be surveyed, and the depth of the water table is uncertain, but estimated to be about 265m (see above). The previous depth of the deepest point in the cave, which was still dry (though muddy), is roughly 259m. However, the mines had recently stopped pumping out groundwater and the water level was steadily rising in the cave.

**The End - 21st of October 2021**
A return trip to Armageddon had to wait for a few months. Dawid van der Spuy had emigrated to Ireland in January and I had relocated to Spain in June. Besides the two of us and John, there were not many people keen to return to push the extension. In September/October I was back in South Africa to undertake fieldwork. John, and I took the opportunity to return to Armageddon.

When we left the cave the last time, I was confident that getting across the second pit would not be too difficult. I thought I had seen the route to take, bolting up and left to what looked like a decent ledge that I could then move along. When we returned and tried this, however, we quickly realised it would not be so simple. The rock quality was poor and heavily fractured. Trying to climb up threatened to pull down large sections and it was impossible to find anything that didn't sound hollow when hit with a hammer. After trying various alternative

routes, I eventually found one that involved going down a bit and then traversing along the edge of the pit.

Once safely on the other side, I untied and set off to explore the next section: a passage about 50 m long, with a very unstable floor of loose rocks and dirt, which sloped gently down and ended at a drop about 5 m high. Reaching the edge, I looked down and out to see only .... water. At last! We had reached the end of the extension, at least the end of what we can explore while staying dry. Torchlight revealed a flooded passage about 35 m long and 8 m wide. The roof sloped down until it touched the water. We placed a couple more bolts at the top and John and I abseiled down to the water's edge. The ground dropped away quite quickly and soon John and I swam around in the water that was probably 50+ m deep in places. Shining our headlamps into the water we could sometimes see large boulders and the floor far beneath us. In other places we couldn't even see the bottom and our torch beams disappeared into the depths.

Unfortunately, neither of us had a camera with us, so the only record of what the end of the extension looks like is in our minds; at least until someone takes a camera (and diving gear) along on the next trip...
Satisfied that we had reached the end of the extension, we returned to the surface, reaching it at about 18:00.

**Return Attempt – 9th of October 2022**

John, Dirk van Rooyen and Dejan Praprotnik returned to the extension and found that about half of it was now underwater. They reached the water just beyond the End of Fault area at a depth of about 326m. All further exploration would basically be impossible.

A few months earlier, the club had discovered that during Covid some of the mines in the area had shut down and it's believed that they may have stopped pumping out water, thus causing Armageddon to rapidly fill up with water. When we've discussed this with those mining companies, they've insisted that they always continued pumping.
The question remains; how far might we have been able to push the Bathole had we reached it a few months earlier?

# Dr. Jacques Martini

## Caver Extraordinaire

By Roger Ellis

What can one say about Jacques Martini, where to start and how to tell the story of this remarkable man and his caving exploits?

I first met Jacques when he came out to South Africa in the early nineteen seventies from Switzerland with his wife Claire. The couple took up residence in Pretoria and being a geologist Jacques worked for the Geological Survey Department. Being a caver at heart and having done some extensive caving in both France and Switzerland he naturally looked to see who was caving here in the Transvaal and came in contact with SASA (Tvl.), the South African Spelaeological Association (Transvaal Section). We can say in retrospect that we are glad it was SASA (Tvl.) he connected with and not CROSA, the Cave Research Organisation of South Africa, our hated rivals at the time, or else his caving talents would have been to their advantage and not ours.

I first joined SASA (Tvl,) in January 1970 and Jacques joined in June 1972. At the time Carl Rietbroek was the Chairman and suddenly there was this letter to 'Dear Sir' from this French speaking man whose English was only just recognizable, wanting to find out about caving in South Africa and how he could join the club. Having to explain that he needed to go through a process was a challenge but Jacques stood up to the plate and it wasn't long before we began to understand the background to this remarkable man.
As a caver living in Switzerland, he had participated in many a new cave exploration in both Switzerland and France and had developed a great interest in cave surveying. He kept us enthralled as he described many of his exploits and we soon realised that we had an experienced caver on our hands. Now at that time in SASA (Tvl.), cave surveying was not our thing, we were

cave explorers, we had photographic memories of the caves we visited, we could tell tales of exploration and discovery, sometimes we may have not known where we were in the cave but we were never lost. Back then, the only survey work I can recall was in Boons Cave.

At that time Carl had been approached by the then owners who wanted to commercialize the cave. Their approach to Carl was to gain as much info about the cave and to have someone manage it and that person was going to be Carl. Consequently, to understand the cave and to have something to show potential visitors, Carl asked me to assist him do a survey. We did quite a chunk of it, learning as we went, but eventually the owner changed his mind about developing the cave and the process of the survey ground to a halt.

Then along came Jacques. He was of the opinion that you never went caving without doing a survey of the cave while you were down there. His attitude was why explore and then have to go back again to do the survey. Yes, a worthy concept but we were cavers, we were explorers and for those who know surveying, especially as it was done in those days, it was a tedious job and held us back from venturing into that next unexplored passage just waiting ahead. But Jacques was not deterred and I can recall his first surveying project was Nico's 2. Now for those who know Nico'2 you will recall on the survey is a chamber known as Growing Stick Chamber. Well, the Growing Stick was Jacques's one metre long stick which he cut from a tree near the entrance and used to measure the cave with. Rotating the stick end to end gave Jacques the distance along passages, across chambers, up walls, all the while using his Silva compass to give him direction and writing and sketching in his notebook.....can you image. The name Growing Stick Chamber came from the fact that at one stage the stick got left in the chamber and the next time we went down the cave the stick had sprouted leaves. Later of course Jacques had a tape and a clinometer and we all joined in to assist him. This would continue over a number of trips down a cave after which he would produce a progressive survey to be presented at each monthly social for us all to gaze upon and get all excited about as we saw the cave unfolding before our very eyes and could see where it was going and the best places to push for further extensions.

Eventually surveying as we explored, became the norm and we all took turns to take bearings, distances and angles, calling them out to Jacques who took the notes and made the sketches. Just take a look at the surveys of Chrystal Cave, Chaos, Wonderfontein, Apocalypse and many, many, more, and see how it all came together.....they are works of art. Today's surveying technology has certainly taken cave surveying to another level but it is computer generated and lacks personality. Take another look at Jacques surveys, there is personality, artistry, precision, skill and the love and passion for caving all wrapped up in the draughtsmanship. Today it's a lost art.

Going back to Jacques early days with SASA(Tvl.). It was during this time that Jacques also displayed his talent for cave photography and those who attempt it will know it's not easy getting the angles just right, the shutter speeds and timing, the flash angles and having an eye for getting the best shot. Jacques had an amazing talent for this only surpassed by Wal Gamble of CROSA who I must acknowledge was a master of the game. I can recall on one occasion after a trip down Groblers II and after the traditional braai, when Carl accidently reversed his car over Jacques's camera. It was as if there had been a death in the family, to the extent that after seeing the look on Jacques's face, Carl volunteered to claim the camera as his own, put in a claim against his all-risks insurance policy and present Jacques with a brand-new camera. It was smile's all around.
Jacques working for the Geological Survey Department in Pretoria and being both a geologist and a caver, suited the department admirably. For one, much to Jacques's delight, they tasked him with studying the dolomite formations countrywide and secondly all cave discoveries were lodged with the department including copies of all reports and surveys. To further assist Jacques in his task they issued him with a special permit which allowed him to access any property in South Africa overlying the dolomite. To our benefit, he needed a team of cavers to assist him explore the caves he discovered which we thoroughly appreciated. He also had access to hundreds of aerial photographs and geological maps which greatly assisted both himself in his job, and the cavers in locating the caves as there was no internet or Google-Earth in those days. To us cavers, Jacques was a godsend.

And so it was that the Cave Register was born. Firstly, by taxing the memories of the old cavers of the day and adding in all the new discoveries, the physical handwritten and later typed register that still exists today came into being. Two copies existed, the one held by the caving club and the second by the Geological Survey Department.
Jacques was also a prolific writer and wrote numerous scientific articles. Many for the SASA Bulletin which is internationally distributed. It was by this means that so much was written about the caves of South Africa that is known today.

It was around this time that a new caver joined the SASA (Tvl) ranks. Steve Hine was his name, a geologist himself and a man of great enthusiasm. Steve also worked at the

Geological Survey Department where he met Jacques. He was also a product of the new generation of IT boffins and was intimately involved in the then developing use of computers and the software that was available. That made him something that Jacques was not and when Steve proposed putting the Cave Register on computer to be available to all cavers, Jacques was immediately concerned that the secret location of all our caves would become an open source to all and sundry and was total opposed to the concept and when the committee unanimously agreed to Steve's proposal, Jacques threw in the towel and resigned from the committee. Feeling the loss of Jacques, but determined not to give into him, the committee asked Steve to go ahead with his proposal and here we are today.

From that time on Jacques dropped off the SASA (Tvl.) scene for quite a while. He didn't resign from the club, he just went off and did his own thing, still on the caving scene but with some of his fellow employees working with him at the Geological Survey Department to assist him in his caving endeavors. They were namely Garwie Moen and Andre Keyser, and together they made some remarkable discoveries and participated in some serious caving. Of particular mention was their discovery of Blue Lagoon Cave, a phreatic maze of rare beauty adorned with a remarkable abundance of aragonite speleothems and containing numerous lakes. Strangely however Jacques still continued to publish their new discoveries and surveys under the banner of SASA (Tvl.). As time went by, Jacques, with encouragement from his fellow cavers in the club, slowly returned to active membership of SASA (Tvl) much to the delight of the members.

Jacques was a fanatical caver, known to us all in the caving club as the 'Caving Commissar', a man who never seemed to tire in a cave and who had many of us believing he had a magical watch which when he went caving stood still, and when we would suggest it was time to leave the cave Jacques would look at his watch and say, in a French accent "Non, Non, there is still plenty of time" and much to our chagrin would disappear off down another unexplored passage with us all in tow. So well-known was Jacques by his nickname that down Mogoto Cave beyond Maguire's Drop, to the left of the system you can find the Commissars Crawl, a horrendously small passage, half full of water, along which Jacques had disappeared calling on us to follow him. Reluctant as we were, we did follow him and to our amazement the Right-Hand Series was discovered. On the other side of the main passage lies Duffins Delight, another horrendous Martini crawl which leads to the Left-Hand Series. There was just no holding the 'Commissar' back.
Jacques was also known as 'The Carbide Man' for his passionate use of his carbide headlamp. While the rest of us cavers used miners cap lamps and later LED cap lamps, Jacques would stubbornly insist that only by using a carbide lamp with its limited range were you obliged to crawl to the end of a passage and see if it didn't turn left or right or up or down. He was right and proved it many times.

Not only was Jacques a great caver and cave surveyor, he was a highly qualified geologist and it was his intense geological knowledge of the structure of the dolomite in the Sterkfontein area that gave the SASA (Tvl) cavers the advantage in their search for missing cave diver Pieter Verhulsel. After the police divers gave up looking for Peter the cavers continued their search in the belief Peter was still alive somewhere in the cave and eventually found his body in a remote and previously unknown section of the cave. A sad but meaningful end to terrible event.

Jacques was also a renowned mineralogist, well known internationally for the discovery of numerous new minerals, notably:

*Sasaite, a new phosphate mineral from West Driefontein Cave, Transvaal, South Africa (1978).*

*Mbobornkulite, hydrombobomkulite and nickelalumite, new minerals from Mbobo Mkulu Cave, Eastern Transvaal. Ann. Geol. Surv. South Africa 14:1-11, 1980.*

*Sveite, a new mineral from Autana Cave, Território Federal Amazonas, Venezuela. Trans. Geol. Surv. South Africa 83:239-41, 1980.*

*Lonecreekite, sabieite and clairite, new secondary ammonium ferric-iron sulphates from Lone Creek Falls Cave, near Sabie, Eastern Transvaal. Ann. Geol. Surv. South Africa 17:29-34, 1983 (mineral clairite in honor to his wife Claire Martini (1936 —)*

*Swaknoite (Ca(NH 4)2(H PO4)2.H20, orth arhambic), a new mineral from Arnhem Cave, Namibia (1991).*

*Two new minerals originated from bat guano combustion in Arnhem Cave, Namibia (1994) (pyrophoshite and arnhemite).*

*Gwihabaite (NH 4,K)NO3, arthorhom bic — a new mineral from Gcwihaba Cave, Botswana (1996).*

*Pyrocaproite (Mg (K,Na)2 P207, monoclinic), a new mineral from Arnhem Cave, (Namibia) derived from bat guano combustion (1997).*

Jacques wrote numerous articles for various scientific

journals and publications for both local and worldwide distribution and visited a number of countries during his career pursuing his speleological interests. He was also particularly active in Australia which he visited on a number of occasions. There along with fellow caver Mark Sefton, an Australian and also a previous member of SASA (Tvl), they spent much time exploring and surveying Bullita Cave, the longest (120km) of a series of extensive, horizontal, joint-controlled, dense network maze caves in Australia, which lie at shallow depth beneath a well-developed Karren field.

In the late nineteen nineties Jacques reached retirement age at the Geological Survey Department and with a desire to return back to his home country and much to our regret, he left South Africa and settled back in Switzerland.

However, Jacques was not going to sit back and put his feet up and quickly established a relationship with the University of Geneva, and was a member of the Swiss Speleological Society. He later joined the French Heritage Association when he relocated to Saint Remeze in France, a karst area in France full of sinkholes and caves, where Jacques was in his element. There Jacques was very active, still involved in research, being very much involved in field trips, wrote numerous articles and continued giving lectures.

I corresponded with Jacques for many years during his retirement and we regularly shared news on what we were doing and the caves we were visiting. Of particular interest to him is what we were doing in Botswana on the Gcwihaba Caves Project. Jacques had been to Drotsky's Cave (now the Gcwihaba Cave) back in1993 along with John Irish and Eugene Marais and had written a substantive article on the mineralogy of the area. While there Jacques had also visited !WaDoum Cave, a cave of rare beauty in the harshness of the Kalahari.

John and Eugene had formed a caving club in Namibia (then Southwest Africa) called SWAKNO (Suid Wes Afrika Karst Navorsing Organisasie) and together with Jacques, they conducted a number of caving expeditions across Namibia and together were responsible for the discovery, exploration and survey of the majority of the caves known across the country today.

It was Jacques's collaboration with John and Eugene that led to the SASA (Tvl) expedition to South West Africa (SWEX86) that ultimately led us to the discovery of Dragonsbreath Cave, the world's largest underground lake. SWEX86 was followed by SWEX87 to conduct the underwater exploration and survey of the lake.

Jacques passed away on the 31st October 2024, at the age of 89. A man about which a book could be written, a legend lost but never forgotten, and a man we as cavers owe a lifetime of gratitude for what he did for us and for caves and caving in South Africa. We were sorry to see him leave our shores and we are sorry to see him finally depart this world. Our condolences go out to Claire and his children and to Jacques we say farewell, we were privileged to have known you.

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