

beneath the circular entrance hole 3 feet in diameter. They then move down the side of this large pile of limestone debris to the floor of the cavern which slopes away towards 'the edge'. Until May 1973, no one had ventured beyond this rubicon without strict safe-diving disciplines being practised.

How "The Shaft" was Formed

"The Shaft" is recognised as one of the world's most spectacular freshwater diving caves and it is estimated that over 8,000 dives had been made in it by 1973. It is located in what is known as Thompson's Paddock, which is 5 hectares in size. It was discovered in 1938 when one of a team of horses being driven by a farmer stumbled. The cause was a hole about one foot in diameter. Water glistened far below. The limestone rim was enlarged later for exploring and study purposes.

At 2pm on 28 May, 1973 Mr F.W. Aslin was driving near Mount Schanck, an extinct volcano close to Allendale East, when he heard the announcement of the tragedy on his radio. He looked at the heavy clouds on all sides. He thought, "there will be no direct sunlight in "The Shaft" today".

Mr Aslin was then a Field Assistant with the South Australian Mines Department and he was engaged in water research. He was also the Senior Caver in the South-East and he was in charge of Dry Cave Search and Rescue in the South-East of the state and South-Western Victoria. His experience was spread over 20 years. He was invited to contribute something on the geology and geomorphology of "The Shaft" at the Government's Committee of Enquiry. He described "The Shaft" in broad terms as follows:

"This cave is typical of many similar deep solution features of this part of South Australia. Its depth which is great is basically the result of solution occurring at a time of much lower sea level and corresponding ground water level. All deep seated caves in this area are oriented along a north west — south east major axis, or within plus or minus 30 degrees of this angle. The cave owes its shape to a process of roof breakdown caused by lateral solution at or near water table, creating a roof span so great it was not able to support itself. This process is sometimes referred to as 'upward mining'.

I suggest that the likely cross sectional shape will be similar to irregular 'steps and stairs' leading down and out. I suggest that the term used by survivors and even the police, 'over the edge', in the extreme south east end of the cave is nothing more than another one of these 'steps' and should in fact have its horizontal counterpart at yet a lower level. It would be impossible to determine what the absolute depth of the cave would be."

Mr Aslin explained that limestone is open grained, porous and soluble. Sink-holes or caves, are the resultant void formed when water which has become aggressive — slightly acidic — acts on soluble rock. Rain water becomes aggressive when it falls on plant matter and picks up carbon dioxide from humic acid

in the root zone. This water is most aggressive very close to the water table. In time, sections of a cave 'give way' and drop from the 'ceiling' above the water table. The resultant recesses look like domes from which hang chandeliers above halls and dining-rooms in gracious old Victorian and Edwardian mansions.

One of these domes in "The Shaft" undoubtedly confused Christine Millott and Gordon Roberts and was a factor regarding their deaths. It is situated approximately above 'the edge' or the 'drop off'.

Two litres of air released through a diver's breathing function expand to a volume of 4 litres under water as it rises towards the surface — in this case, some of it against the white ceiling of the dome above the 'drop off'. It follows a small pocket of air would form, however infinitesimal and the factor of 8 divers operating vigorously together at one stage must have had a significant effect.

Air above the water level in this situation would create a mirror effect. The light from the divers' torches as they peered upwards could well have brought about an illusive impression of natural light coming through the small, round entrance above the 'rock pile'. The situation therefore became one of disorientation and fear for Christine and Gordon, at a stage when their air supply was dangerously low. This tragic episode will be referred to again later.

The Southern Ocean is a few kilometres further along, at the end of Bay Road, which passes through Allendale East, terminating at the small fishing village of Port MacDonnell. It is possible the 'steps and stairs', as suggested by Mr Aslin, reach out beneath the sea and form part of a vast, intricate freshwater drainage system, flowing from the Grampian Mountains in Victoria through underground caverns and waterways with origins dating back over 40 million years.

On cloudless days near noon, when the sun is passing over the sink-hole, its rays beam down through the water creating a shaft of diamond-blue light roughly 3 feet wide. Someone once made a black and white movie film, capturing a swimmer plunging feet first within an aura of shiny bubbles towards the 'rock pile'. He stretches out his arms at right angles to his body and his forearms extend beyond the shaft of light into a black void. They disappear instantly, as though they have been erased from a sketch by a capricious cartoonist. It is a spectacular sight. Many locals hold the view this sink-hole got its name from 'diver talk' about swimming through this impressive shaft of light, described eventually as 'diving down "The Shaft" '.

The Fatal Dive

As part of their dive on 28 May, some team members planned on reaching 'the edge of the perimeter' and descending to 250 feet. If this depth was reached they thought a record might be achieved. The group did not use the 'buddy system', a pair of divers staying very close to each other and trained to function as a unit, nor did they set up safety lines to avoid getting lost. The Coroner was to find later that

no member of the group was clearly the leader with responsibility for co-ordinating this dive. And silting, buoyancy, cold, depth and altitude are vital factors for consideration when diving in fresh-water sink-holes.

As H. Morrison and S. Sinclair point out in their book "Australian Scuba Diver":

'Inland waters usually have large concentrations of silt which is easily stirred up, causing reduced visibility. To overcome the problem, divers should be naturally buoyant and keep well off the bottom, at the same time ensuring that finning is kept to a minimum. If silting occurs the diver should ascend until clear water is encountered.'

A conscientious leader would have a duty to brief his divers in all these matters before a descent into such a hostile environment. It will be seen how "The Shaft" has a claim to such a category.

Smith told Detective Sergeant Frank Whitrod who, as officer in charge of the Mount Gambier Criminal Investigation Branch, had the responsibility of preparing a report for the Coroner, Special Magistrate R.F. Stokes, JP, inter alia:

'The day before, the deepest we got was just under 200 feet, but we got nowhere near 'the edge'. We approached it, but we didn't go to it. We sunk a shot line to the 'rock pile'. Those who didn't have torch batteries up to scratch renewed them. All other equipment we checked to make sure we had full tanks. We took all normal safety measures. But we didn't use a safety line for two very good reasons. There were 8 of us in the party — you can imagine the difficulties with 8 safety lines! It was impracticable because of the rocky bottom. And the prime reason was, we were continuing on from the dive of the previous day and the plan was that no one would wander out of the above light.'

But cloud masses began crossing the nearby coast line at approximately 12.45pm that day. As to their significance in what followed, Mr Aslin's opinion is already recorded. Smith continued:

'No, a safety line wasn't needed for the type of diving which was planned. But if I had known they were going down the deep hole, I would not have permitted it. That sort of diving should be done with safety lines and in smaller groups. I had no idea the others were going to swim over 'the edge', or further into "The Shaft", at any stage prior to the dive.'

Smith said the group descended to the top of the 'rock pile' where he arrived first. He then led off in the direction where they finished the day before 'towards the perimeter about 80 feet from the 'rock pile'.'

He went on:

'Just before we reached the perimeter at a depth of 180 feet, I started to feel light-headed as though nitrogen narcosis was coming on. I looked at my depth gauge and turned to the others following close behind and signalled that I was dizzy and I was returning to the top of the 'rock pile'. They signalled they were OK and were going on. I got back to the 'rock pile.'

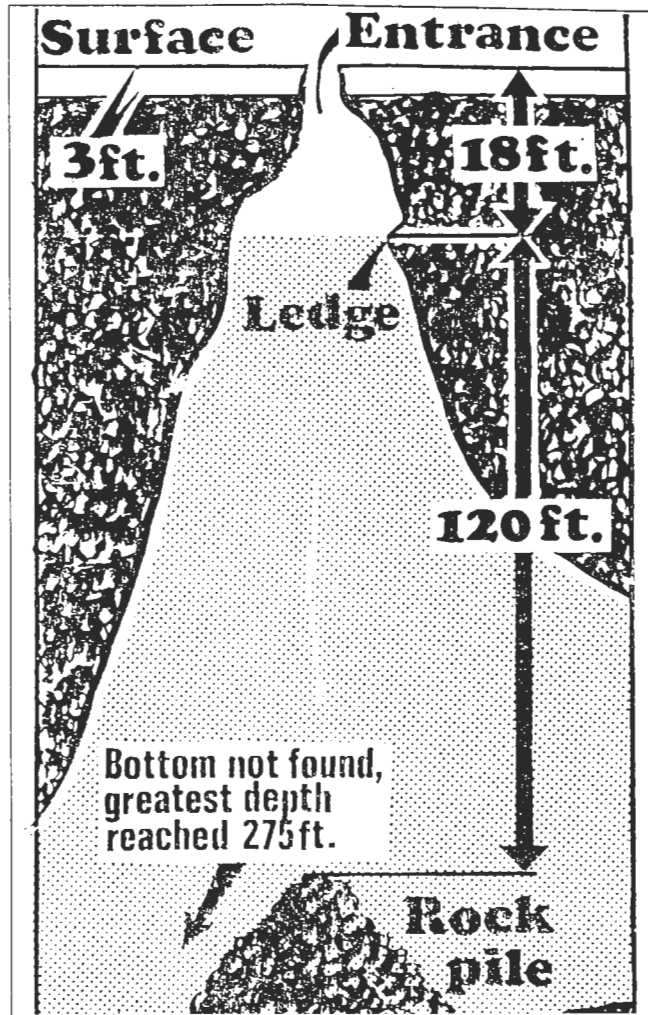


Diagram of the underground limestone cave known as "The Shaft".

Trained depth divers are well aware of the phenomenon of nitrogen narcosis, or 'raptures of the deep', or 'depth drunkenness'. An Adelaide professional diver, Mr Mack Lawrie, later explained that from a depth of about 120 feet, nitrogen could enter the blood and produce symptoms similar to alcohol. People affected become giddy, have hallucinations, and develop a general euphoria, a feeling of well-being and over confidence. Physical dexterity is slowed down appreciably; judgement and decision-making ability are significantly impaired.

Smith swam around the bottom of the 'rock pile' at a depth of 130 feet looking for old animal bones and skeletons. After 7 or 8 minutes, he ascended to the top of the pile. When he reached the shot line he saw a torch light. It was Glen Millott surfacing from the direction Smith had parted with the group. They surfaced and found Larry Reynolds had come up. Thirty seconds later Peter Burr emerged. He said he had not seen the other 4 divers.

Glen Millott immediately returned to the bottom, surfaced shortly after and reported seeing nobody. Smith took another air tank and dived. He said:

'I immediately went to where I had last seen the others and in fact, I went to 200 feet towards the

'drop off', and just before the 'drop off' I found Stephen Millott's torch and camera. I went on and noticed that the bottom had silted up very badly. I went over the 'drop off' to 225 feet. I could not see a hand in front of me. I could not see anybody. I ascended to where the silt was less and I could see back to the 'rock pile'; I rose up after 10 minutes, did decompression and surfaced. The result of my search was finding the torch and camera, nothing else. The ambulance had arrived. Peter Burr went down for a quick look. He used my tank because we had little air left. He didn't find anything. That was it.'

Detective Sergeant Whitrod asked Smith for his opinion of the cause of the tragedy. Smith said:

'Because the divers went outside the planned dive and went over the 'drop off', their visibility was hampered by the silt, and they shot up rapidly and thought they were coming to the surface. But instead of coming up at an angle, or from laterally across the cave bottom to the 'rock pile' to reach the surface, they went straight up and found themselves in a roof dome, which no one was aware of until afterwards. I think they got into a situation where they realised they were running low on air and had to do something quickly — but they ended up under that dome.'

Glen Millott gave his version:

'We descended the shot line 115 feet to a mount of rocks and started to swim around. We went lower to roughly 200 feet below water level. Here I saw my sister, Christine, a few feet away and everything appeared in order. At this stage, the divers were completely safe as the light from the hole above was visible. Overall, five minutes had elapsed. Here I had decided I had gone far enough and it should have been far enough for the others. I was running short of air. We had all entered the water with full air tanks, having filled them that morning at Mount Gambier. Each tank holds 72 cubic feet of air and on this basis all other divers would also have been running short of air at this time. For this reason I decided to return to the surface, but I saw some others swimming on and going deeper.

I tried to touch my sister who was in front of me, but was unable to do so. I wanted to signal to her it was past time and we should be returning to the surface. I started to return to the surface. At this point I was only just on the safe side, which means I was running out of air and soon to be entering decompression time. I went up and broke surface. I only had at the maximum about 2 minutes of air left. Anyone remaining in the water after I broke surface was in danger — not only through running out of air, but in the decompression stage.

Joan Harper handed me a spare tank and regulator and I went below again. From the shot line I moved out and down to about 150 feet. I saw no sign of the missing divers. At this stage there was no hope for any of them, as they would have run out of air.'

It was unfortunate Glen Millott could not signal to his sister; Christine was the only diver who was not equipped with a decompression meter.

Peter Burr came close to being a victim as he explains — and he reveals where some of the initial diving time was expended:

'We dived to the bottom of the 'rock pile' and spent five minutes taking photographs. There was good vision and we could see each other. After that, 5 or 6 started moving off under a ledge and they swam along this ledge which appeared to drop away a few feet. I followed for maybe 50 feet. I was feeling the effects of nitrogen narcosis; I was pretty groggy, so I went up to another diver — I think it was Glen Millott — and indicated I wanted to look at his depth gauge. But he moved off before I got a chance to see what it was. I was looking at the bottom because the water was pretty clear and I was using my torch. Then I saw two divers heading back.

I looked at my decompression meter and realised that my time was up. I turned to go back and saw it was dark, and I couldn't see the entrance. The fellow whose gauge I tried to look at was there and I waved for him to follow me. I swam up under a ledge and I saw another diver there. He put up his arms as though he was lost. He had his torch and he was up under the roof. I looked into a small hole. The water was silted up by now and I couldn't see very far in front of me. Then I saw a light, a diver, and I looked behind and I think I saw another diver.'

Burr saw other divers ahead and he followed them. Then he began running out of air and he pulled his reserve rod. He looked at his decompression meter and found he was 'a couple of minutes over time'. He went up 10 feet below the surface and used up his reserve air. He thought the tragedy occurred because his companions went on further than planned.



A diver entering the shaft.

Glen Millott is thought to have been the diver in front of Burr when he turned to go back. Larry Reynolds was last in line, preceded by Gordon Roberts and Christine Millott. Reynolds checked his depth gauge after being signalled to by Roberts. He saw that he was at 225 feet. Roberts gave the signal to ascend and they did so, followed by Christine. They ascended rapidly. Roberts and Christine entered a 'dome like' hole in the ceiling of the cave. Reynolds, who was about 10 feet below, saw them frantically waving their torches about their heads, seeking a way out. Roberts signalled with his arms that they were lost. He and Christine looked frightened.

Reynolds' torch went out and he dropped away from the roof. His torch came on again. Then he saw a diver near the floor and descended to a point near him where he could see faint, diffused light from the opening of "The Shaft". He swam up to it and found Glen Millott and Bob Smith at the surface.

One survivor, just before he turned back at 200 feet, saw a companion swimming strongly downwards deeper into the 'drop off' blackness. This tragically lone diver was John Bockerman. He was probably affected by nitrogen narcosis. His was the last body retrieved from under an out-jutting ledge at 215 feet. A recovery from this awkward position and depth was the most dangerous episode for the police divers of the whole operation.

When the first police divers went into "The Shaft" the day after the tragedy, they found the deep water still 'very muddy' and visibility was poor. Undisturbed, the waters of many subterranean caves are clear. "The Shaft" is famous for its crystal, blue-tinted water. However, limestone silt clings to the walls of these caves and waterways. When divers swim further into them, their flipper action agitates the still waters and the silt is dislodged. The waters turn milky white, opaque. A torch beam cannot penetrate them. The light is bounced back, as are the beams of a motor vehicle's headlights in a thick fog. Consequently, a diver's visibility is reduced to nil. The inexperienced become confused.

Along with nitrogen narcosis, loss of direction caused by silting is another contributing factor to disaster in water-filled limestone caves. If a diver is not in contact with a safety line leading to an escape route and a back-up air supply, death caused by hypoxia is a likely result.

Dr R.A. James a Forensic Pathologist with the Forensic Science Centre, Adelaide performed post-mortems on all the bodies after recovery. He recorded that 'the cause of death in each case was lack of air with terminal drowning — hypoxia'. Hypoxia is discussed in the "Australian Scuba Diver" as follows:

'Maintenance of normal levels of oxygen is important for the normal function of the human body. Under water, if the level drops below 0.16 atmospheres absolute (i.e. the diver becomes hypoxic), results may be fatal.

Cause: The individual causes of hypoxia are many and varied. Generally, there are two major categories:

1. Failure of sufficient oxygen reaching the lungs, e.g. equipment failure, exhaustion of air supply, contamination and drowning.

2. Failure of sufficient oxygen reaching the tissues, e.g. cardiac arrest, air embolism, and carbon monoxide poisoning.

Signs and Symptoms: When the partial pressure of oxygen in the body fails, an oxygen debt is incurred; the amount of oxygen required exceeds the amount available. As this debt increases a feeling of fatigue may be replaced by confusion, unco-ordination and panic; while in very rare cases of hypoxia, a final stage of euphoria (a feeling of well being) may be reached, followed by unconsciousness.

Prevention: Regular equipment servicing and the use of a contents gauge should eliminate the failure of air supply. Contamination will be avoided by getting scuba cylinders recharged at a reputable dive shop.

Correct training in the practical aspects of diving, good dive planning and maintenance of good physical condition will ensure that a situation involving hypoxia will not occur.

If the total supply of oxygen to the diver is removed, a condition known as anoxia will result. Anoxia is a state of no oxygen as opposed to hypoxia, which is a state of low oxygen'.

Dr A.B.Mc. Cant came from Victoria to investigate "The Shaft" deaths professionally. He graduated from the Adelaide University in 1962 as a Bachelor of Medicine and Surgery. By May 1973, he had 20 years diving experience and three years as a commercial consultant to the oil-gas industry divers. During those 20 years, he had dived in most of the sink-holes in the Lower South-East, using scuba diving equipment;



Rescuers entering the Shaft.

that is, an air cylinder fitted with a regulator, hose and mouth piece (demand), with and without pressure gauges attached. The gas used in this equipment was air.

Dr Cant, in the presence of Detective R.W. Hamdorf of the Mount Gambier C.I.B., inspected 16 air cylinders used by "The Shaft" divers, 14 of which were of 72 cubic feet capacity, and 2 of which were coupled with twin 50 cubic feet capacity. He found that, in general, they were of good to new quality and had been tested recently and stamped by recognised New South Wales Dive Clubs. He inspected the auxiliary equipment, as well, including regulators, depth gauges, decompression meters, inflatable vests, wet suits, flippers, face-masks and snorkels. He found this equipment to be of good quality.

Inspecting the 'O' ring at the entrance to the air cylinder used by Peter Burr, he saw signs that 'the user sucks his cylinders dry'. By that, the doctor meant:

'He dives deep and long, and in fact stays in the water to the last moment. This is not a regular safe practice'.

After completing his investigations Dr Cant told the police in his statement for the Coroner:

'From what Smith told me about his diving plan, I feel that the following points are faults:

1. Too many divers in too narrow an area.
2. No emergency divers stationed at the surface, top of the pinnacle, and lip of the 'drop off'.
3. No standby tanks strung on the shot-line at varying intervals for the full depth of the dive, for the use of those with malfunctioning equipment, or those who had run out of air.
4. A shot-line of inadequate length — e.g. not dropping to the full depth of the intended dive.
5. A failure by the leader to ensure an adequate 'buddy' system within the party. Or on the other hand, failing to have rope linkages between members of the diving team.

Each of these points are basic facts which are taught in all diving courses as safety procedures.

From what I understand, each member of this party was an experienced diver and in fact certified instructors and should have been aware of the safety procedures which I have outlined above'.

The Reasons for the Dive

The divers arrived in Mount Gambier on Saturday, 26 May and erected tents at the Queen Elizabeth caravan park opposite the city's famous Blue Lake contained in an ancient volcano crater. The water turns a deep blue in summer.

The caretaker warned Christine Millott about undertaking a deep dive in "The Shaft" only hours before her death. She came into the kiosk for a cup of coffee on Monday 28, and said:

'We are going down "The Shaft" to 250 feet. It will be a bounce job — straight down and straight up.'

The caretaker was worried about this depth and he asked her if she knew what she was doing. She was



A professional diver, Mr. Mack Lawrie, informing Mount Gambier Police about the situation in "S86" after an exploratory dive. His expression and stance tells all.

confident — "We are all diving instructors". He told her he had seen a lot of experienced divers meet their ends in the sink-holes. He described Christine as a petite, strikingly attractive brunette, who was 'full of life'.

The President of the S.A. Underwater Explorers' Club, Mr P. Christopher was interviewed about 'bounce diving'. He said that if the divers were intending a bounce dive to 250 feet, they could risk only one or two minutes at that depth. Such dives are done to avoid the bends. After a short time at the bottom divers should come straight up.

He had dived in "The Shaft" during 1968. He described it as being in three stages. The first goes to about 130 feet; it is good diving to this depth and that is an accepted safety limit. The next stage goes nearly 200 feet. Beyond 200 feet, Mr Christopher understood that 'the hole slopes away even more and you lose sight of the surface. A line would be needed if you were going below 200 feet'.

Police Recovery Operations — Preliminary Search

When the Underwater Recovery Squad arrived at Mount Gambier during the afternoon of 29 May, its members went immediately to "The Shaft" and performed a search dive to 200 feet. No bodies were found. But several items of equipment used by the

Sydney group were recovered at this depth. The Squad was neither practised nor properly equipped to dive so deep in fresh water. 'Operation Recovery' was to be a 'learn as you go' exercise for these valiant young police officers.

Senior Constable Harnath's team comprised of: First Class Constables A.P. Cormack, T.R. Carr, R. Jeffrey and Constables G. Possingham, T.D. Rieniets (later Inspector), D.S. Young and W.J. Clarke.

Assistant Commissioner Calder then ordered there would be no more diving until he arrived in Mount Gambier on 30 May with two senior officers to appraise the situation. Diving was recommended under his control on 30 May, without success. The search was abandoned.

A debriefing was held on 1 June, and Detective Sergeant Whitrod was instructed to prepare a report for the Coroner. Arrangements were made with the owner of the property to announce publicly that no civilian diving would be allowed in "The Shaft" until further notice.

During these preliminary recovery operations, a Royal Australian Naval diving team was in the district commanded by a Lieutenant. They arrived at "The Shaft" and the Lieutenant offered the assistance of his divers and equipment after seeking approval from his Unit Commander in charge of diving at HMAS Penguin, Balmoral, Sydney. The Lieutenant brought with him his entire crew and all its facilities, including a recompression chamber (The S.A. Police Department did not have one nor was there one in that part of the State, despite the proximity of a number of coastal seaports supporting a large cray-fishing industry) to treat possible attacks of the 'bends'. In effect, the Navy was ready to provide skilled back-up support for the police divers and by using Naval equipment such as underwater communications, lights, compasses and a compressor, the police would be able to carry out hazardous dives in 'uncharted waters' with a minimum of risk.

However, when the Lieutenant saw the basic nature of the police diving equipment he was concerned. He noted, as well, there was no provision for on-the-spot maintenance or minor repairs if the need arose.

A conference was held and it was concluded the recovery operation was essentially a police concern. Moreover, in view of their unfamiliarity with the Naval equipment, the police divers might have difficulty becoming used to it at short notice. Consequently this recovery operation was abandoned pending further arrangements. The decision was based on the following considerations:

1. The police underwater recovery squad did not have appropriate and adequate equipment for safe, deep fresh water diving, particularly in sink-holes such as "The Shaft".
2. Its divers were not adequately trained to dive below 100 feet in fresh water, nor were they profoundly experienced below this depth, particularly in view of the likely incidence of nitrogen narcosis.
3. The Navy divers, who observed the police

recovery attempts, held the view their method of operation could be improved upon.

Eventually squad supervisors, Harnath and Cormack, attended a Diving Supervisors' Course at HMAS Penguin, Balmoral. They were trained in safe diving skills to 180 feet, a depth Naval divers were permitted to descend. The arrangement was reached between the Police Commissioner, Mr H.H. Salisbury, who had not long before arrived from England to fill the posting and Royal Australian Navy authorities in Sydney. No further recovery attempts would be made in "The Shaft" by the police squad until its members were trained to an acceptable expertise and in all aspects its equipment was adequate.

Recovery Operations — First Body Found

While in Rotorua, New Zealand, in January 1974, I read in the press that Stephen Millott's body had been found by an underwater film crew.

On Saturday, 12 January, a T.V. technician of Cremorne, Sydney arrived in Mount Gambier with six other people, all from New South Wales, to make a pilot film on cave diving in the Lower South-East. The expedition was financed by the Commonwealth Council of Arts. Dives were conducted in several caves and filming took place.

During Thursday 17, the team was given permission by the owner of the property to dive in "The Shaft" from 12.45 to 3.45pm despite police advice that no one should enter this sink-hole until all the deceased divers were recovered. This diving activity was uneventful.

At 6.50pm on Tuesday 22, the technician, accompanied by three of his companions, dived to a level of 50 feet on the north-west side of the cave. Two 240 volt Photo Floods of 14 hundred candle power were used as lighting and they lit up that section of the cave 'like daylight'. A bizarre incident followed.

The technician told the police later:

"Behind the two film subjects in our party, I saw an object which appeared to me to be another diver. Upon a second inspection with the lights, I realised it was a body dressed in a wet suit. I turned the light away and signalled the rest of the party to surface. The body was not filmed. When I saw the body, it was to the 50 feet level and pinned under a ledge by the buoyancy of its vest. We exited immediately and informed the owner. He rang the police."

At 10am on 23 January, Senior Constable Harnath and Constable Rieniets dived to 50 feet in "The Shaft" and found Stephen Millott's body floating against the sloping roof of the cave. They towed it to the surface. Other members of the police team then dived to 180 feet in a westerly direction without finding any other bodies. Further recovery efforts were then abandoned.

Earlier mention was made of Dr R.A. James performing all the postmortems on "The Shaft" victims. His detailed findings will be presented later. At this stage his comments regarding identification are of interest:

"While the body is presumably that of Stephen

Millott, 22 years, the appearances are not externally identifiable. In view of the limited number of possible persons, teeth were taken for comparison. These have been referred to Dr K. Brown, an orthodontist, Adelaide."

Recovery Operations — Remaining Bodies Found

The farmer's family were not comfortable with the thought of having three remaining bodies in the sink-hole and so, during March 1974, the farmer contacted, without telling the police, an amateur scuba diving group in Melbourne, with a view of having them locate the rest of the victims. Ironically at this stage the police underwater unit was close to acquiring all the sophisticated equipment it required and the necessary deep-diving expertise to enable it to complete recovery operations with a wider safety margin.

Consequently, Mr R.G. Trayner of North Melbourne, led a team of divers in "The Shaft" on Saturday, 9 March. His account of that expedition is as follows:

"At the owner's request I went to "The Shaft" with six divers on 9 March. At 1pm four of the team including me, went below to explore. At 185 feet, I saw one body laying on its back, face up. Another body was directly beneath it (Christine Millett and Gordon Roberts). A third body was 20 feet below them (John Bockerman). I went to the deepest body and saw that the life vest was half undone. I grabbed hold of the breathing tube to this vest and unsuccessfully tried to pull the body up. I was wearing double tanks, giving me a bottom time of 15 minutes altogether. The team surfaced and we reported to the police."

At 10am on 10 March, Senior Constable Harnath and his group were at "The Shaft" preparing to dive. The Victorian divers stood by to help. I was in charge of operations, assisted by Sergeant Applebee, executive NCO with the recovery squad and Sergeant P. Seebohm, officer-in-charge of the Mount Gambier Police Station. The police divers were Senior Constable Cormack, First Class Constables Carr, Jeffrey, Possingham, Clarke and Constable Rieniets.

Diving began at 11am and was abandoned at 1pm because the water became murky with limestone silt. It was noted in the log: 'Too many people were operating in the sink-hole'.

In his report which follows, Senior Constable Harnath mentions some difficulties his divers encountered during this recovery attempt:

"We began diving in "The Shaft" after asking the Victorian divers to show us the location of the bodies. They were unable to relocate them even at 165 feet. They laid a line in the direction the bodies were last seen. We made several search dives without success. At 1.20pm diving was stopped; the water was too murky. A conference was to be held before further action was taken. The next day the Victorian team again dived without success. Constables Cormack and Rieniets then dived and located the bodies and tied a rope to a body wearing a red wet suit. This



February 1973: Senior Constable Martin Harnath examining a torch endorsed 'Sandy' found in thick mud on the floor of sink-hole "S86".

(Photograph courtesy of "The Advertiser" S.A.)

body was lying across another. They were 195 feet down. Another body was visible about 40 feet away and 20 feet deeper, partly under a ledge."

The bodies found and brought to the surface from 195 feet were Christine Millott in red and Gordon Roberts. They had sunk together onto one of the 'steps' below 'the edge' under the dome, when their air supply was exhausted. Perhaps they went down clutching each other in a last fearful embrace, knowing death was barely minutes away.

Curiously, these bodies were found in a westerly direction from the 'rock pile', virtually opposite to where the survivors indicated they might be found. The possible explanation is the survivors were more disorientated than they realised during their disastrous dive. The attempted recovery of John Bockerman's body from its awkward position under a ledge at 215 feet was a stiff test of the courage and stamina of the police divers. Despite their recent intensive training and practising, Senior Constable Harnath and Constable Rieniets felt the effects of nitrogen narcosis when they attempted to tie a rope to it on 12 March. They had to desist.

In essence, nitrogen narcosis confound the senses and significantly retards physical dexterity. A diver thus affected would find tying a rope onto diving harness a slow, fumbling exercise in cold, gloomy depths — and a risky one. It was recommended a 'G' shaped snap-clip used on horse leads and items of harness might be attached to the end of a rope so that a diver could open it by pressure with his thumb and clip it onto the harness in two uncomplicated

movements. The idea was acted upon and a rope so fitted was fixed to John Bockerman's harness on 7 April.

Recovery Operations — The Last Body

After the March recovery operation, the squad was ordered back to Adelaide for a respite. Finally, Assistant Commissioner Calder approved of diving to 215 feet and the team arrived at Mount Gambier on 7 April. Constables Rieniets and Possingham entered "The Shaft" soon after and fixed a line to Bockerman.

The plan was: A dive to secure the remaining body with a lead line — a rest day because of the great depth and the possible incidence of nitrogen narcosis — recovery day.

Although divers did experience narcosis effects during both diving days, their training since the beginning of this ordeal enabled them to cope with the condition; and their modern equipment facilitated the operation and sustained morale.

John Bockerman's body was lifted out of "The Shaft" on 9 April, 1974. 'Operation The Shaft' was completed 11 months and 11 days after he and his unfortunate companions undertook their last dive.

Impure Air Allegations

When the divers arrived in Mount Gambier to begin their operations, the air cylinders they brought with them had been filled in Sydney. Before the fatal dive, some cylinders used had been replenished with air obtained from a Mount Gambier supplier.

All air cylinders belonging to the party were taken by the police as exhibits for the coronial enquiry. Some members of the group protested to Assistant Commissioner Calder that those cylinders which were not used during the dive, Joan Harper's for example, should not be confiscated because they would be needed for club diving activities in Sydney. They claimed they had very few spares. The request seemed reasonable.

In their collective official account of what went wrong with their dive, the survivors clearly identified two significant possibilities, viz: underwater safety discipline was minimal, and some divers descended beyond a safe air capacity. The cylinders they were wearing would be the cardinal focus of enquiry; and so, the unused cylinders were released.

Smith, upon emerging from the 28 May dive, became aware members of his party were overdue. When Glen Millott surfaced and realised the situation, he 'immediately returned to the bottom, surfaced shortly after and reported seeing nobody', Smith told Detective Sergeant Whitrod. He then explained: 'I took another tank and dived'. He said he went over the 'drop off' to 225 feet; he did not report experiencing narcosis.

Joan Harper hoped she would not be required in Mount Gambier once her statement had been obtained. After she left with the unused cylinders, Smith and Dr Cant had an 'unofficial' chat about the dive.

Smith told Dr Cant that upon emerging from "The Shaft" he exchanged his almost empty 'Mount

Gambier' cylinder for what he claimed was a 'Sydney' air cylinder. Smith said that when he was using 'Mount Gambier' air he experienced narcosis at 180 feet on his first dive; but on his second dive, using 'Sydney' air, he did not. He alleged there was 'something wrong with the local air' and it caused him to get narcosis more than he would normally do. He said he had dived as deep as 300 feet before without being drastically affected by narcosis. He claimed he was very familiar with the first stages and the more severe stages, of narcosis and upon this premise he contended 'there was something wrong with the air in the tank filled at Mount Gambier'.

In his account of what happened during the fatal dive, Glen Millott said, inter alia:

"We had all entered the water with full air tanks, having filled them that morning at Mount Gambier."

If he had experienced discomfort with the air in his tank, he did not mention it to Detective Sergeant Whitrod during that important interview. The doctor was sceptical. He had investigated a similar allegation following a sink-hole drowning in the district previously. He conducted decisive tests with air cylinders and a suspect compressor. He established the allegation was groundless.

In his view, based on long experience in extreme depth diving, Smith's contention arose from conjecture. However, he did not dismiss Smith's concern out of hand and he was prepared to mention it to the police if Smith didn't. Smith had not raised the issue with Detective Sergeant Whitrod during the interview for the purpose of establishing the cause of the tragedy. But before either of them reached a conclusion, the issue surfaced dramatically.

Relying on professional resources, Dr P. Harper, Joan Harper's husband, conducted tests on her 'Mount Gambier' air cylinders and it was alleged the findings suggested the air was impure and caused the deaths of the other divers in the group. The source of this impure air, it was further alleged, was a compressor used to supply air in a store at Mount Gambier. This was the compressor which Dr Cant tested following the earlier sink-hole tragedy.

The cylinders actually used by the survivors during the last dive and the immediate search attempts, on 28 May were held by the police as evidence for a coronial enquiry.

Observing strictly the vital 'chain of evidence' procedure from the moment of possession, Detective Hamdorf delivered these cylinders to a Government Analyst in Adelaide, Mr P.T. Smith.

First Class Constable T.R. Carr of the Underwater Recovery Squad inspected the compressor from which some of the Sydney divers alleged they had been supplied impure air, and then filled a police cylinder from it. He handed this cylinder to Detective Hamdorf standing by, who suitably marked it in his presence. Constable Carr then conveyed it to analyst Smith in the Department of Chemistry, Adelaide. No impurities were found in this air sample.

Following the recovery of each body specimens of blood and muscle tissue obtained by Dr James



October, 1972: David Edmeade's body being removed from the sink-hole "S86" by members of the Underwater Recovery Squad.

accompanied by the victim's air cylinder were conveyed personally by a witnessing police officer to analyst Smith. He found no traces of carbon monoxide in these body specimens and the cylinders appeared harmless, as well. For example, he was of the opinion the air in John Bockerman's cylinder contained less than 10 p.p.m. carbon monoxide per volume.

After the gas in the four cylinders was analysed for carbon monoxide content, Mr Smith removed their tops and his findings upon examination of the interiors are interesting:

1. The tanks of Stephen and Christine Millott 'both appeared free of contamination'.
2. G. Roberts' tank 'contained approximately 3 litres of water and the interior of the cylinder was slightly corroded at the opening'.
3. J. Bockerman's tank 'contained approximately 100 millilitres of water and the interior of the cylinder was heavily corroded'.
4. 'No oil or grease was found in any of the tanks'.

It is a significant observation that the interior of Bockerman's tank was 'heavily corroded' because the chemical action of corrosion absorbs oxygen, given enough time.

That section of the Coroner's finding regarding allegations of an impure air supply follows:

'As to the allegations by the survivors that the deceased persons' demise was brought about as a consequence of impure air having been supplied by a sports store at Mount Gambier on the 28th day of May, 1973 prior to the fatal dive during which cylinders so refilled were used by the deceased persons, it is significant that tests run on four cylinders recovered and taken into custody by the investigating police officers at Mount Gambier, where they were kept under constant surveillance, revealed in each of the three tests so run a purity factor within the tolerance and/or better than those required by the Royal Australian and United States Navies.

Despite the results of tests carried out on the cylinders which were taken back to Sydney by the survivors, the same reliance cannot be placed on such results, as upon the tests carried out in Adelaide, for the following reasons:

1. No care was taken to protect the cylinders from outside contamination while in transit to Sydney and their storage, pending the carrying out of tests.
2. The apparatus used in two of the Sydney tests was substantially inferior to that used in the tests conducted by the Department of Health in Adelaide; and in the case of the third Sydney test the procedures adopted were described by one expert witness as 'producing a finding which would be of no scientific value whatsoever'.
3. There is no guarantee the air so tested was, in fact, air from the Mount Gambier sports store.

On the evidence before me, it is apparent that the source of entry of outside air to the air intake of the compressor at the store premises was uncontaminated and there was no source of

contamination which could have caused the air to become foul during the filling process through the store's compressor unit. In the light of all the evidence the allegation that the deceased persons met their deaths as a consequence of having inhaled impure air supplied to them by the Mount Gambier sports store is entirely without foundation'.

Post-Mortem Results

As indicated, Dr R.A. James, the Government Forensic Pathologist, performed post-mortems on all the deceased divers and he found they died of 'lack of air with terminal drowning — hypoxia'. Regarding his autopsy conducted on Stephen Millott, he recorded these comments:

'The apparent circumstances of the death raise three possible modes:

1. Death from air embolus — this appears unlikely from the statements of the survivors. The expected autopsy features, if present, could not be found after such a period of time.
2. Death resulting from contamination of air in the diving tanks — analysis of the air in the tanks and analysis of the deceased's muscle tissue and intravascular residue showed no carbon monoxide and this possibility can be discounted.
3. Death by drowning (with or without the effects of nitrogen narcosis) — the finding of infrequent but definite diatoms identifies this as the immediate cause of death.

Some aspects of this case are almost unique in Australia. The remarkable preservation after eight months submersion in water is attributed to the cold, essentially sterile, environment encouraging adipocere formation and discouraging putrefaction'.

In relation to Christine Millott's death, the doctor said:

"The circumstances of this case are similar in most aspects to those of Stephen Millott. However, the absence of diatoms in this case does not allow a definite cause of death by drowning to be made. There is no autopsy evidence to support death as result of contaminated air. It is possible (but not provable), that death resulted from elective asphyxiation as a result of lack of air. Death by drowning is also possible in spite of the failure to demonstrate diatoms, by virtue of the previously demonstrated dearth of diatoms in this sink-hole."

Although Dr James commented in Stephen Millott's case that some aspects of it were most unusual for Australia, he learnt later that the features had been seen overseas.

In view of some of the medical terms used in the post-mortem reports, I consulted him and he kindly supplied the following information:

'When a body dies it almost always is broken down by putrefaction. This process allows bacteria and fungi normally resident in the body and other organisms from outside the body, to overgrow and over a period of months reduce the

body to a skeleton.

The other process which proceeds at the same time is autolysis (self-breakdown). Enzymes in the cells are liberated at death and these break up the normal cell structure. The organs feel softer than normal; and down the microscope the normal cell detail is destroyed. It requires no bacteria to help it along and cooling the body in a refrigerator (or cold water in these cases) does not stop it.

Putrefaction requires a warm environment and cooling will stop the organisms overgrowing. This is why bodies are stored in a refrigerator at 4°C. In these cases the cold water stopped putrefaction, but did not stop autolysis for the year or so after death.

In the absence of putrefaction adipocere was formed. This strange substance is a white 'soap-like' tissue which results from the hydrolysis and hydrogenation of body fat. It requires a moist environment and is uncommon in Australia. Because these bodies were in a wet, cold, sterile environment, this adipocere steadily developed. If they had been left there for the next 100 years they would probably have looked much the same as when the bodies were recovered a year or so after death.

Diatoms are silica-shelled micro-organisms found in most water sources. They are profuse in reticulated water. Drowning, with inhalation of water into the lungs, allows these diatoms to enter the blood circulation and impact in various organs. With a prolonged post-mortem interval, the finding of diatoms in the organs is the only method of establishing presumption of drowning. The organs are digested away with acid to leave the silica shells of these diatoms, which can then be seen with the microscope. The diatoms are classified by their shape and naviculars (boat shape) and discoid (circular) forms are the most common.

The adrenal glands are the small envelopes about the size of a postage stamp above each kidney and contain the body's adrenalin. They are recognised to be well preserved in drowning cases and were easily identified here in spite of the prolonged post-mortem interval.

Air embolus is frequently found in scuba-diving deaths where over expansion of the lung and subsequent lung tearing occurs with ascent decompression. The presence of air in the large blood vessels or heart is easy to see in the fresh state, but could not be assessed in these cases. The circumstances of these deaths, however, were those of divers inexperienced in sink-hole techniques getting lost and running out of air with terminal drowning. It was the failure to use extra tanks, 'buddy' systems and life lines which led to the tragedy. The early allegation of contaminated air from the motor compressor was able to be refuted when the tanks were recovered and tested'.

As a deceased's wet suit was being removed dur-

ing each autopsy procedure, the adipocere discussed earlier was revealed as a buffer between the body and the suit. It obviously would have served in the nature of a preservative for a very long time.

Sir Keith Simpson, once described as England's top criminal pathologist, describes 'adipocere' as a white, glutinous substance given off by dead bodies as their fatty tissues degenerate about five weeks after death.

The Coroner's Finding

Special Magistrate, Mr R.F. Stokes, in his capacity as one of Her Majesty's Coroners, handed down a comprehensive finding regarding these sink-hole deaths and extracts have been quoted at appropriate stages of this account. He concluded as follows:

'I find that the four divers died in "The Shaft" while under water on 28 May, 1973 and that the cause of death was that they overstayed their bottom time, their air supply became exhausted and they died from hypoxia. I find also, despite their claims they were experienced divers and four of them were qualified instructors, including two of the deceased persons, Stephen Millott and Christine May Millott, none of the group was an experienced sink-hole diver and that no proper safety precautions were taken, in particular, by setting up a fail-safe return-to-surface system; nor did they have a 'buddy' system or any other recognised safety system'.

He was critical of the fact that:

'no air tanks were secured to a shot line at various levels for use by divers who had run into decompression time', as well.

He further commented:

'No member of the party had been clearly shown to have had the responsibility of coordinating the dive or to act in the capacity of leader'.

He pointed out that 'Christine did not have a decompression meter', and he concluded by saying:

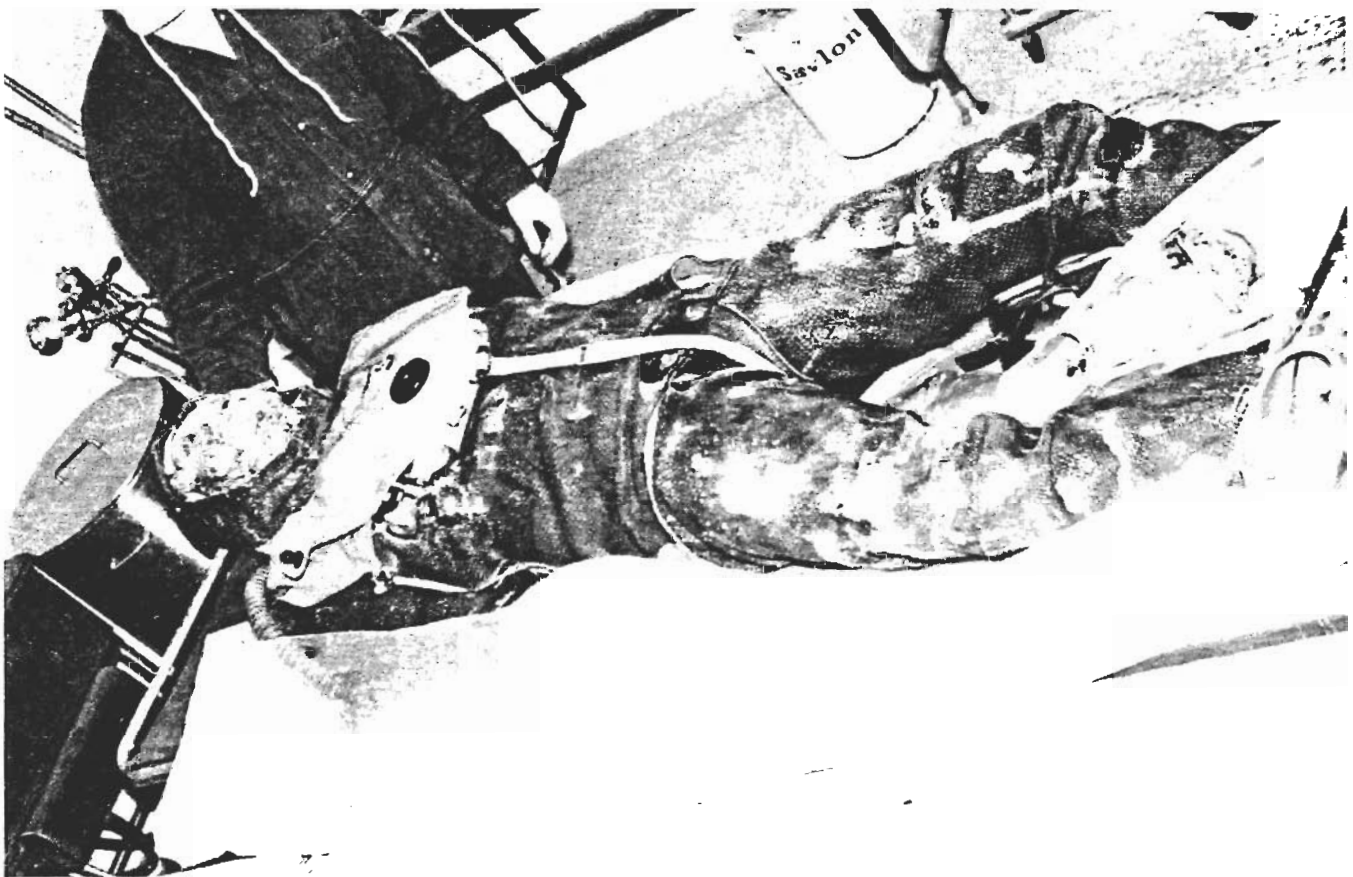
'The general plan of the dive was to complete the circumnavigation of the bottom of "The Shaft", a third of which had been done on the previous day. It was expected it would take three days to complete'.

The grim fact remains* that four intrepid young people, in the flower of their youth, died in pursuit of an objective — the exploration of the perimeter of the vast floor of "The Shaft" surrounding the "rock pile". Sadly, theirs is the old story of high adventure gone wrong. So long as the human race endures and walks hand-in-hand with the Goddess Curiosity, the story will have many sequels.

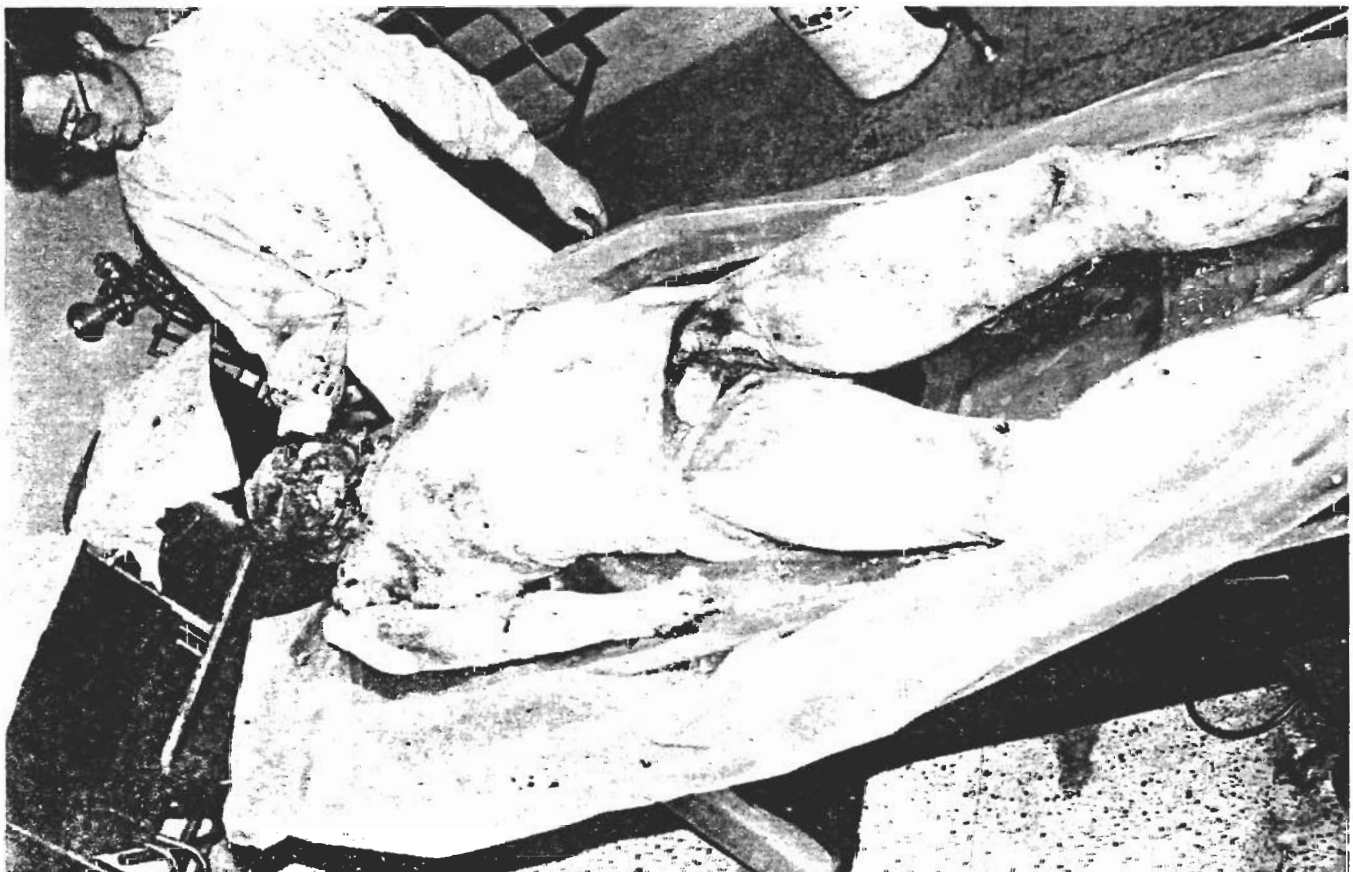
The Pines or "S86"

Not long before "The Shaft" disaster there was an earlier episode in the Mount Gambier district sink-hole history. There was much which could have been learnt from it if it had been widely known and studied by people interested in water-cave diving, particularly "The Shaft" victims.

On 9 October, 1972 approximately seven months



March 1974: George Roberts' body, Mount Gambier morgue.



March 1974: Pathologist Dr. R.A. James with George Roberts' body prior to the post mortem. Remarkable preservation is evident despite submersion in water for many months.

prior to "The Shaft" drownings, David Edmeades, 38 years; Christopher Rands, 17 years; and Sandra Leach, 18 years, members of the S.A. Underwater Explorer's Club, died when they became lost in a sink-hole known as "The Pines" or "S86" in a pine forest owned by the Woods and Forests Department at Burrungie, 18 miles north-west of Mount Gambier.

On 15 July, 1971 Sandra's 15 year old sister, Deborah Leach, was found murdered on a bleak stretch of ocean beach below Fort Largs, the South Australian Police Academy. Twice in so short a time had tragedy visited the Leach family in exotic circumstances.

When the Underwater Recovery Squad arrived at the sink-hole, led by Senior Constable Harnath, a conference was held with a professional cave diver, Mr. Mack Lawrie. He was familiar with "S86" and he classed it as dangerous, even for an experienced diver. At a constriction 80 feet down the cave's shaft or tunnel, there was barely enough room for one diver to squeeze through. Having accomplished this, the diver could enter a large water-filled cave with shafts leading off from it like passageways in a house with a central living area. Mr. Lawrie said the walls of "S86" were thick with silt and it didn't take much finning to muddy the water. A sense of depth and direction was soon lost.

He had dived in this sink-hole and knew it well. He suggested it would be safer if he went alone to find the bodies, as he had an idea where they might be. With one diver operating there would be a minimum of silt agitation. He brought up the bodies.

The three divers had become lost in the silted waters; they couldn't find the shaft which led to the surface. The signs were they had panicked and used up valuable air swimming around in circles.

In February, 1973 Senior Constable Harnath and his divers explored and mapped "S86". They found a heavy duty, yellow plastic diver's torch with the name 'Sandy' hand-written in black on its handle. It was embedded in thick mud 100 feet below on the floor of the cave.

Throughout February Senior Constable Harnath and a seven man team explored 30 different sink-holes, some of which had not been dived in before, to prepare a master plan of them. Diagrams of each hole were prepared detailing depth, cave structure and water temperature. The sink-holes were classified as "safe" or "dangerous" and marked on Army Survey maps. The survey resulted from the "S86" deaths.

"The Shaft" was left for the future because of its great depths with inherent dangers below a known "safe" area.

It was said earlier that in the opinion of the Navy divers observing the initial "Shaft" operation, the police equipment "was inadequate" for very deep diving. So, in fairness to Senior Constable Harnath, it should be recorded that he became aware of certain shortcomings with his squad's diving gear during the February, 1973 cave classification operations. He submitted a report accordingly, requesting appropriate new issue.

He informed me, when I took command of the South-Eastern Division (not long before "The Shaft" tragedy), his recommendations were being studied. However, his immediate concern was his squad's lack of familiarity with extraordinary depths in fresh-water sink-holes, particularly where silting was an extra hazard. Though "The Shaft" lesson was spelled out in dreadful terms, at least it taught that only disciplined, experienced and scientifically equipped divers should probe its secrets below and beyond the "drop off".

During April, 1974 the Acting Premier Mr Des Corcoran announced "S86" would be sealed permanently. It was on Government land and this could be done without further ado.

Awards - Special Mentions

In the Police Gazette (21 May, 1974) the following announcement from the Police Commissioner's Office was published:

"Senior Constables A.F. Cormack, M.H. Harnath, R.W. Jeffrey; First Class Constables T.R. Carr, W.J. Clarke, G.R. Possingham, T.D. Rieniets; Constable D.S. Young:

For exceptional ability, enthusiasm and determination displayed as members of the Police Underwater Recovery Squad between 29 May, 1973 and 9 April, 1974 at Allendale East via Mount Gambier, where four experienced scuba divers had earlier entered "The Shaft" sink-hole and drowned. Although subject to a continual risk of nitrogen narcosis, the members made a total of seventeen dives. They recovered three bodies at depths up to 190 feet and the fourth was recovered at the 215 feet level; a horizontal distance of about 360 feet from the sink-hole entrance.

The recovery operation subjected each member to great mental and physical strain and its successful conclusion required a team effort and dedication.

The actions of these members in persevering until all bodies were recovered is commendable and reflects credit on the Police Force."

Formation of the Underwater Recovery Squad

The squad was formed in 1957. Its original members were volunteers from the Traffic Police. It was attached to an emergency operations group until December, 1978 when the present Special Tasks and Rescue Force was formed. Other specialist operations groups were placed under the "STAR Force" command, including the underwater recovery squad. Senior Constable Harnath was appointed Diving Director in 1967. Later he was promoted to the rank of Sergeant.

The function of the squad is to search beneath large water sources for bodies, jettisoned stolen property, such as valuables and security safes or any likely evidence connected with a crime. The recovery of bodies is undertaken for two reasons:

1. The protection of a body for scientific and post-mortem examination to assist the State

Coroner's Office and investigating police.

2. Restoration of deceased persons to their relatives for burial.

At the Thebarton Police Barracks one morning during September, 1986 Sergeant Harnath was preparing to do some welding on or near a new aluminium boat much needed for his squad's work. It was about to be taken for a test run. Suddenly, there was an explosion which wrecked the boat; the sergeant was badly injured and died four hours later in the Royal Adelaide Hospital.

In 1965 he received a "Mention" for devotion to duty and efficiency as a member of his beloved squad. He received two "Special Mentions" - one for courage and ability for descending an old mine shaft at Mount Grainger, north of Peterborough in 1969, on a rescue mission; and the other in 1974 regarding "The Shaft" tragedy.

Quiet and unassuming, the late Sergeant Martin Harnath led his team by example. His moral and physical courage was a source of strength and inspiration to all who worked with and around him. Upon his death one of his team paid him an apt tribute:

"Martin Harnath was not simply a member of the Underwater Recovery Squad - he was the squad."

The tragic drownings in "The Shaft" thrust the squad and its members not only into a national, but an international limelight. Scuba divers from parts of the U.S.A. such as California and other countries, have recorded their names in the Allendale East farmer's visitors' book over the years.

Sergeant Harnath told me some time later that "The Shaft" episode was the turning point in his squad's history. The acquisition of updated and sophisticated equipment and the allocation of more time for training programmes and sink-hole classifications, were consequences. As a result, the versatility of the squad's activities increased and created the need for more personnel. It stands today as a national model of its kind.

Sequel

Early in June, 1991 the squad was presented with its own recompression chamber during a ceremony at the Thebarton Police Barracks. The chamber can be set up at an operational site and two patients can be treated simultaneously.

Its practical and morale supportive role for seasoned or trainee squad members in a field operation will enhance confidence and efficiency. It represents a far cry from the risks, the hazards, indeed the dangers, which confronted Martin Harnath and his courageous team at the entrance to "The Shaft" in May, 1973. Their awesome task taunted them month after month. They did not yield. apj

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The Advertiser (Adelaide), September 19, 1986.

Publications: Police Journal (Police Association of S.A.), August edition, 1984.

Personnel: (Assistance gratefully acknowledged)

Mr. F.W. Aslin - S.A. Mines Dept., Senior Caver, Dry Cave Search and Rescue, S.A. and Victoria.

Senior Constable C.W. Budd, S.A. Police Force.

Doctor A.B.Mc. Cant, Melbourne, Vic.

Mr. P. Christopher, President S.A. Underwater Explorer's Club.

Doctor R.A. James, Pathologist - Forensic Science Centre, Adelaide, S.A.

news

Police Rounds

Compiled by Alan Patterson, Research Officer apj (Former Librarian N.S.W. Police Department) and Fred Baddeley, United Kingdom Correspondent

Digital Information Handler (Sony)

Produces a still photograph from a video or surveillance camera allowing it to be sent to a

second monitor where it could be labelled for evidence or identification.

Police Review, 17 Aug., 1990. a.p.

Fugitive Search

A new free 4 page newspaper is proving an overwhelming success in Albuquerque, New Mexico.

The material for the paper is provided by the Bernalillo County Sheriff's Department and includes pictures, vital statistics, and criminal deeds of the country's most

dangerous fugitives.

The real success of the paper is that of the 52 felons appearing in the first edition, 25 have now either been apprehended or have turned themselves in.

Local costs have been less than US\$200.00 per run of 10,000 copies and foreign language and state-wide editions are being planned.

Law Enforcement News, May, 15/31 1991, page 1. a.p.

Continued on page 148