

SOUTH



AUSTRALIA

FINDING OF INQUEST

An Inquest taken on behalf of our Sovereign Lady the Queen at Adelaide in the State of South Australia, on the 23rd, 24th, 25th and 25th of February 2004 and the 6th day of April 2004, before Wayne Cromwell Chivell, a Coroner for the said State, concerning the death of Deborah Christine Campbell.

I, the said Coroner, find that, Deborah Christine Campbell aged 42 years, late of 86 Victoria Street, Nhill, Victoria died at Nora Creina, South Australia on the 17th day of March 2002 as a result of salt water drowning.

1. **Introduction**

- 1.1. Deborah Christine Campbell was aged 42 years. She had undertaken a diving course on a cruise in the Whitsunday Islands about three years prior to her death, according to her partner, Mr Donald Rogers. Mr Rogers said:

'Deb wasn't an overly confident diver due to being unfit and overweight, which restricted her mobility.'

(Exhibit C58, p1)

- 1.2. Mr Rogers also told me that Ms Campbell had suffered back injuries in a car accident when she was young, and took Panadeine Forte for the pain. He said that, although he did not see her take any on 17 March 2002, it is likely that she would have taken some. He said that she would have also taken a tablet in the morning for an 'ulcerated oesophagus' (Exhibit C58, p2).

- 1.3. On 17 March 2002 Mr Rogers and Ms Campbell decided to go scuba diving at Nora Creina, near Robe in the South-East of South Australia. Senior Constable Darryl Wright of the Water Operations Unit of South Australia Police told me:

'Nora Creina is a small holiday settlement with no facilities located approximately 25 kilometres south of the township of Robe. A relatively sheltered bay protected by steep rocky headlands at either end provides an ideal diving location and is popular amongst divers seeking Rock Lobster.'

(Exhibit C65a, p2)

- 1.4. Mr Rogers described the conditions on that day as 'ideal', with calm water, a slight swell and clear skies. He said that they swam out to Centre Rock, about 250 metres offshore, on the surface using their snorkels. They had a couple of rest stops on the way.
- 1.5. When they reached the area of the rock, and began diving, Ms Campbell had trouble getting down because in Mr Rogers' words, she was 'too buoyant' (T138). He put another weight on her belt. They began diving in only 3 to 4 metres of water.
- 1.6. After about 10 minutes, Ms Campbell indicated that she wanted a rest. They surfaced, and headed for some rocks so that they could climb out and rest. Mr Rogers described what happened next:

'What happened next is still somewhat blurry to me and seemed to happen all very quickly but probably occurred over several minutes. A wave caught us by surprise, it wasn't a large or exceptional wave but pushed us into the rocks, I saw Deb still had the regulator in her mouth at this time as she was forced under the water a couple times and appeared to be struggling for buoyancy.

The waves kept forcing us into the rocks and Deb was continually going under the water and I don't believe at this stage the regulator was in her mouth properly. Deb was still going under the water and I was attempting to pull her up, I struggled with her weight belt and was also trying to get some air back into her buoyancy vest but it did not appear to be going up, eventually I managed to get her weight belt off which helped increase her buoyancy. I was able now to keep her above the water and noticed her lips had gone blue. I took the regulator out of her mouth and started to give her mouth to mouth but was getting no response. I was yelling and screaming for help and someone must have heard me because a short time later a boat arrived to assist.'

(Exhibit C58, pp3-4)

- 1.7. Mr Brian Kay and his friend Mr Arthur Rogers went to Centre Rock in Mr Rogers' boat after hearing Mr Rogers' cries for help. When they arrived, Mr Kay saw Mr

Rogers supporting Ms Campbell in the water. She had vomit around her mouth and was blue in the face (Exhibit C27a, p2). They took her aboard the boat and attempted cardio-pulmonary resuscitation (CPR) but without success. They returned to the shore and continued CPR until an ambulance arrived.

- 1.8. The ambulance officers attempted resuscitation, but they were unable to achieve a sustained cardiac output. Ms Campbell's life was formally certified extinct at 5:55pm that evening (Exhibit C22a, p2).

2. Cause of death

- 2.1. A post-mortem examination of the body of Ms Campbell was performed by Professor R W Byard, Forensic Pathologist, on 19 March 2002. Also present was Dr C J Acott, Director, Diving Medicine at the Royal Adelaide Hospital.

- 2.2. Professor Byard diagnosed the cause of death as salt water drowning. The significant findings from the post-mortem examination were as follows:

- Ms Campbell was only 171cm tall and weighted 104kgs;
- There were scars indicative of previous surgery on both the abdomen and lumbar spine;
- There was marked oedema (swelling) in the lungs and pleural effusions (fluid in the pleural cavity).

- 2.3. Professor Byard commented:

'Death was due to salt water drowning with supporting evidence being marked oedema of the lungs with bilateral pleural effusions. The only injuries were compatible with recent attempts at resuscitation. No intravascular gas was observed on post mortem X-rays and after review of the case, Dr C Acott concluded that there was no evidence of ascent barotrauma. No underlying organic diseases were present which could have caused or contributed to death. The results of blood toxicology were not available at the time of this report.'

(Exhibit C23a, pp1-2)

- 2.4. A toxicological examination of blood samples taken at autopsy was performed by Ms H Felgate, Forensic Scientist. No significant findings were made, and in particular no codeine (which is an opiate and one of the constituents of Panadeine Forte) was detected (see Exhibit C24a).

2.5. Dr Acott gave oral evidence at the inquest. He is a very experienced diver, and is one of Australia's leading experts in diving medicine.

2.6. Dr Acott offered the following comments:

'Ms Campbell was obese and physically unfit. She drowned because of fatigue due to an exhausting (and probably anxiety provoking) surface swim prior to attempting to dive.'

(Exhibit C66, p2)

2.7. Dr Acott said that in addition to Ms Campbell's obesity and lack of cardio-vascular fitness, the following factors contributed to Ms Campbell's difficulties in the water:

1. Her back problems may have been exacerbated during the surface swim and the dive;
2. The oesophageal reflux would have increased due to the pressure underwater (and, presumably, the tight wetsuit). This may have had the following consequences:

'Reflux or regurgitation would have occurred after she had swallowed salt water during difficulties on the surface prior to her death. Regurgitation may have precipitated laryngeal spasm (closure of the laryngeal inlet) stopping her from breathing and causing hypoxia (a lack of oxygen in her lungs) leading to unconsciousness and drowning).'

(Exhibit C66, p2)

3. If she had taken Panadeine Forte (although this was not detected post-mortem), Ms Campbell may have been sedated and not thinking clearly;
4. Ms Campbell was overweighted, carrying 18kgs when 10-12kgs was more appropriate, even for a woman of her size.

2.8. In summary, Dr Acott said that, in his opinion, Ms Campbell was not medically fit to dive, and he would have given her that advice if he had been asked to perform a medical examination prior to this dive (Exhibit C66, p3).

3. Diving issues

3.1. Senior Constable Darryl Wright also told me that in his opinion, fatigue and inexperience played important parts in Ms Campbell's death.

- 3.2. If Ms Campbell had quickly removed her weight belt when she first had trouble staying on the surface, she might not have experienced so much difficulty. The weight belt itself was excessively heavy (18kgs) which also would have added to her fatigue. The decision to swim out to the rock using the snorkel, rather than paddling out underwater, could also have unduly fatigued Ms Campbell.
- 3.3. Senior Constable Wright agreed with Dr Acott that Ms Campbell was not fit enough to dive. He praised Mr Rogers' efforts to keep Ms Campbell on the surface, and in attempting to resuscitate her (Exhibit C65a, p6).
- 3.4. As to the rest of Ms Campbell's equipment, Senior Constable Wright said that, although the air cylinder was overdue for testing, it was in serviceable condition and would not have contributed to the death (Exhibit C65a, p9). There was an adequate amount of air in the tank, and the air was of appropriate quality.
- 3.5. It was reported that when Ms Campbell's cylinder was recovered from the seabed, the 'K' valve was opened by less than one turn. Senior Constable Wright tested the valve and found that provided it was open by more than $\frac{1}{4}$ turn, it worked adequately (Exhibit C65a, p10). I find that this did not play a part in Ms Campbell's death.
- 3.6. Ms Campbell's regulators were all in excellent condition (Exhibit C65a, pp11-12). Her buoyancy control device was also found to be in appropriate working condition to the extent that Senior Constable Wright was unable to explain why Mr Rogers had difficulties in inflating it while trying to keep Ms Campbell afloat. Perhaps, in the agony of the moment, he was using the device incorrectly.

4. Conclusions

- 4.1. I accept the evidence of Professor Byard, Dr Acott and Senior Constable Wright and find that the cause of Ms Campbell's death was salt water drowning. The major factors which caused this tragic outcome were Ms Campbell's obesity, her lack of cardio-vascular fitness, her inappropriately heavy weight belt, and her inexperience which led her to become excessively fatigued. Added to that there were Ms Campbell's health problems, including oesophageal reflux, and her back condition for which she was taking sedative medication.

5. **General considerations**

5.1. I have heard evidence in the inquests into the deaths of Robert Anthony Walker, Neville Arthur Kinnear, Rex Alexander John Humberstone, Deborah Christine Campbell and Jennifer Lee Barrington at the same time. These deaths occurred between 24 February 2001 and 21 April 2002. A startling number of similarities exist in these five cases:

- In three cases a CAGE (cerebral arterial gas embolism) was involved - Walker, Kinnear and Barrington;
- In four cases a lack of cardio-vascular fitness was evident - Walker, Kinnear, Humberstone and Campbell;
- Four of the deceased were obese - Walker, Kinnear, Humberstone and Campbell;
- All of the deceased had medical conditions relevant to the cause of death which could have been detected in a properly conducted medical examination:
 - enlarged heart (cardiomegaly) - Walker, Kinnear, Humberstone;
 - other heart disease (myocarditis) - Walker;
 - lung disease - Kinnear, Humberstone, Barrington;
 - back problems - Campbell, Barrington;
 - oesophageal reflux - Campbell;
 - ear problems - Barrington.
- In four cases, the deceased wore a wet suit that was too tight, interfering with breathing and possibly causing reflux - Walker, Kinnear, Humberstone and Campbell;
- In two cases, the deceased wore a weight belt that was too heavy causing excessive fatigue – Campbell and Humberstone; and in one case, the weight belt could not be quickly released - Humberstone;
- In one case the BCD was faulty, also causing excessive fatigue - Humberstone;
- In only one case did the ‘buddy’ system break down - Barrington;
- In two cases, poor diving technique may have contributed to the death - Walker, Campbell;

- Two of the deceased had recent diving training but were inexperienced - Campbell, Barrington, and the other three were experienced but had not had recent training - Walker, Kinnear, Humberstone;
- Three of the deceased had recently seen a doctor - Walker had been told by his cardiologist not to dive but ignored the advice; Humberstone had recently seen his General Practitioner but not in relation to diving; and Barrington had ignored her General Practitioner's advice to consult her surgeon, and had earlier misled the medical practitioner conducting the diving medical examination;

5.2. Dr Acott said that in his opinion all of these deaths were preventable. He said:

'A diving medical is required before a candidate commences scuba diving. This medical, in SA, does not have to be performed by a medical practitioner knowledgeable in diving medicine. (If the physics and unique physiology involved with diving and hence the problems are unknown the risks can't be discussed). Once the candidate is 'passed fit' he/she is fit for the rest of their lives. This is 'nonsense'. Commercial and professional divers are required to have an annual medical by a medical practitioner suitably qualified in diving medicine. However, annual diving medicals for 'recreational divers' are controversial. There needs to be some recommendation that states that if a diver suffers an illness or their medical or general fitness changes they should seek guidance from a suitably qualified medical practitioner regarding the risks that may be associated with continuing to dive. Perhaps annual self assessment forms should be introduced that will highlight problems which will then lead to a discussion with a suitably qualified medical practitioner.'

(Exhibit C66, p4)

5.3. Dr Acott suggested that:

- Recreational diving medical examinations should be conducted by medical practitioners who are trained in diving medicine;
- The medical practitioner conducting the recreational diving medical examination (if he/she is not the subject's regular medical practitioner) should require the subject to produce a referral letter detailing the subject's medical history as far as it is known;
- Candidates should be made aware by the medical practitioner that health factors are a concern and are potentially lethal not only to the patient but to their 'buddies' in the water, so they are under a duty to disclose them.

5.4. Senior Constable Allen suggested that a public awareness campaign should be conducted to remind divers of the dangers associated with hookah equipment (Exhibit

C21a, p13). Mr Humberstone's hookah equipment (as distinct from the BCD and weight belt) was not faulty and did not cause Mr Humberstone's death, so I am prevented by Section 25(2) of the Coroner's Act from making such a recommendation.

5.5. Senior Constable Allen also recommended that all recreational divers should undergo a regular medical examination (Exhibit C4a, p25).

5.6. Senior Constable Wright suggested that there are three options available to address these issues:

1. Do nothing;
2. Conduct an educational or public awareness campaign about the dangers of diving with a medical condition and recommending regular checkups;
3. Make periodic medical examinations compulsory.

5.7. Senior Constable Wright also pointed to the fact that occupational divers are required to undergo an annual medical examination by a medical practitioner trained in hyperbaric medicine.

5.8. The difficulties with option 3 are:

- Resentment from recreational divers;
- Expense;
- The lack of sufficiently trained medical practitioners;
- Unenforceability.

5.9. Senior Constable Wright commented:

'As recreational SCUBA diving is just that, a recreation, it is my opinion that it should remain as free from legislation and regulation as is safely possible. My preferred option would be Option 2, for the recreational diving industry to take steps to promote safe diving practices by the development of an education programme specifically aimed at the need for divers to maintain a good level of fitness.'

(Exhibit C65a, p16)

5.10. Senior Constable Allen made a similar recommendation (Exhibit C4a, p25). I agree.

6. **Recommendations**

6.1. Section 25(2) of the Coroner's Act 1975 empowers me to make recommendations in certain circumstances following an inquest. The section reads:

'A coroner may add to his or her finding any recommendation that might, in his or her opinion, prevent, or reduce the likelihood of, a recurrence of an event similar to the event that was the subject of the inquest.'

6.2. Pursuant to that Section, I make the following recommendations:

1. All persons engaged in recreational underwater diving should undergo an examination by a registered general medical practitioner trained in hyperbaric medicine on a regular basis, preferably annually but not less frequently than every two years.
2. Medical practitioners should decline to conduct such examinations unless they are appropriately qualified to do so.
3. Medical practitioners conducting such examinations should, if they are not the subject's regular medical practitioner, require the subject to produce a referral letter detailing the subject's medical history as far as it is known.
4. Medical practitioners conducting such examinations should warn the subject that diving is a potentially lethal activity if undertaken by a person with certain medical conditions, and that absolute honesty in providing background medical history is called for.
5. If there is any doubt about the subject's health, the medical practitioner should arrange such follow-up tests as chest X-rays, hypertonic saline tests, or whatever else may be indicated, before passing the subject as fit to dive. Any doubt should be resolved against passing the subject as fit, until such follow-up tests demonstrate fitness to dive.
6. The recreational diving industry should conduct an awareness campaign among its member organisations and the diving public about the dangers of diving with certain medical conditions, the need for regular medical examinations at least every two years, the need for absolute honesty during such examinations, and the

responsibility a diver has both personally and to his or her diving colleagues to ensure that he or she is fit to dive.

Key Words: Drowning; CAGE; Underwater Diving; Hyperbaric Medicine

In witness whereof the said Coroner has hereunto set and subscribed his hand and

Seal the 6th day of April, 2004.

Coroner

Inquest Number 8/2004 (0698/2002)