

DAVID JOHN WILLIAMS, SWORN AND EXAMINED:

MR TATE: Professor, good afternoon, it's nice to see you again?-- [Indistinct].

Doctor, we have some people involved in the case who are from overseas, America. And they may not be quite as aware of your qualifications and experience as perhaps the rest of us are. So, I'll need to go through the usual initial patter?-- Certainly.

Could I ask you for your full name, please?-- David John Williams.

And could you give us some indication of your qualifications and professional experience as a forensic pathologist?-- I have a Bachelor of Science with Honours in Chemistry, a Bachelor of Medicine, Bachelor of Surgery, I have a Master of Science in Forensic Science, I have a Doctorate of Philosophy in Forensic Pathology. I'm a Fellow of the Royal College of Pathologists of Australasia and a Fellow of the Royal College of Pathologists of the U K. I have the Diploma in Medical Jurisprudence in Forensic Pathology.

Thank you. And I think you've been in practice as a Forensic Pathologist now for some number of decades?-- I have, yes.

You performed an autopsy on Tina, I think on the 23rd of October, 2004, the deceased - please, Doctor-----?-- I'll just check that date [indistinct].

Please bring your papers out, it's not meant to be a memory test. I'm going from your first statutory declaration at paragraph 2?-- 2003.

2003 - I'm sorry, what did I say?-- 2004.

No, I'm sorry, 23rd of October, 2003. Now, in this - this is your first statutory declaration and attached to that is the usual post mortem report that is prepared for these matters, and that seems to be - well, there's one dated the 11th of May, 2005. Doctor, am I right in assuming that there's more than one statutory declaration and more than one autopsy report?-- Yes, there is.

All right. Can you take us through the different autopsy reports. Am I right to assume that the first one is dated the 10th of June, 2004?-- That's correct, yes.

And then the second one is that one I've just taken you to which is dated the 11th of May, 2005?-- Yes.

All right. The statutory declarations which you always complete that accompany your autopsy reports, are those ones exactly the same or did they undergo a change as well?-- Well, I - I brought the one with me from the 10th of June, 2004.

Thank you, all right?-- I don't think there's substantial differences between them.

Doctor, I understand from Edmonds' contribution to the fourth edition of Diving and Subaquatic Medicine, that it's usually thought that the immediate cause of death in diving fatalities is

drowning, and that accounts for some 52 to 86 per cent of the fatalities. Does that accord with your experience?-- It does, but then again for diving deaths, drowning is a - is a cause of death found by exclusion of other causes basically.

Yes, and I was - why I was starting with that was really to ask you that question. Am I right to assume that drowning like other conditions such as ventricular fibrillation, should really be thought about as a terminal event, rather than actually disclosing the underlying - underlying cause of death?-- That's correct, yes.

Now, for example, is it appropriate when we try and understand the cause of death for - for Tina, that we also have to look at all of the surrounding factors to try and bring that history to account whilst undertaking the post mortem before offering a diagnosis?-- Yes.

Would it be fair then to say that we'd have to look at issues such as fatigue and whether that may in some way have been related?-- Yes.

Whether panic, perhaps through inadequate training - whether that is in some way connected?-- Yes.

Whether there was a decreased level of consciousness?-- Yes, all these factors basically.

Yes. Whether it be by intoxication, nitrogen narcosis, seizures perhaps through oxygen toxicity, any cerebral gas, air gas embolisms or hypercarbia, they're all matters that have to be taken into account as part of the diagnostic process?-- Yes, in fact I have a very good paper that I can recommend to you on - on these factors, which is fairly recent.

Yes?-- It's from March, 2006.

Yes?-- And it describes medical factors and then diving techniques, equipment problems and environmental factors basically.

Yes. That could be very helpful, Doctor?-- Sure.

Have you got a spare copy?-- Well, that's my only copy.

All right. Well, you hold onto it for a moment. Now, when we start looking at the medical factors, I take it what we're looking for there, is to see whether there's an underlying cause such as whether the person suffered from acute myocardial infarct prior to the - the drowning, whether the person had epilepsy, diabetes, that sort of thing?-- Yes.

We also need to look at whether there was trauma?-- Yes.

Whether there was any physical disability?-- That's correct, yes.

Equipment failures?-- Yes.

And I suppose also, another issue that automatically comes into play, would be whether or not there was a deprivation of oxygen?-- Yes.

Self-harm?-- Definitely.

And harm by others?-- Yes.

Now, in this case, I understand from your autopsy report that we can discount and exclude pulmonary barotrauma as a cause of death?-- There seemed to be no evidence of pulmonary barotrauma, no.

What about cerebral gas, air gas embolisms or embolism?-- Well, this - this autopsy is a problem in that there are artefacts produced by rescue and by resuscitation.

Yes?-- And one of the great artefacts produced here was gas embolism because of the very rapid rescue.

Mmm, mmm. At history and at post mortem were you able to demonstrate any natural disease, such as heart disease or any other condition that could be considered as a cause of death?-- I found no medical reason for her death-----

Mmm?-----in the post mortem examination.

Mmm. Now, can you help us understand in - in so far as your process is assisted by police, what was your understanding of the factual circumstances leading up to Tina passing away?-- Well, basically the death of an inexperienced person while scuba diving and as far as I'm concerned there are various investigations that have to be done fairly promptly-----

Yes?-----and the CT scan, for example, to look for gas is a very important early investigation.

Yes?-- And obviously it's helpful for the post mortem examination not to have it delayed between death and examination because things like putrefactive change, for example, can give rise to gas formation that negates findings-----

Yes?-----occasionally.

Yes. Doctor, you sounded as if you're - you're halfway through. So, you've looked at those things and there was no - no evidence to suggest that that was a complicating factor?-- Sorry?

No, that's - that's all right, I'll move on, I think we might be at cross purposes. In terms then of looking at some of the other environmental or personal factors such as panic, are they issues that can be looked at all at post mortem?-- No.

It really is a factual question that has to be sorted out perhaps through witness statements and other information that might be made available to the pathologist?-- That's correct, I know that sometimes it's thought that the pathologist has a central role in examination of diving deaths but

for this particular case I feel that my examination just basically excludes natural disease-----

Yes?-----and I'm a bit unhelpful as - as - to explaining why this drowning occurred.

Yes. When we look at drowning from the post mortem perspective, are we able to draw any insight as to what may have caused the drowning to occur, what the underlining cause was?-- No.

Would it be fair to say that from your report we would have a young woman who has drowned and there is no evidence demonstrated at autopsy that would support any natural disease or natural disease process as being the cause of death?-- That's correct, yes.

Now, Doctor, if I can just take you to page 3? There's been some discussion about this lady's - Tina's cardiovascular system, because as I understand you're aware she did have a arrhythmia but was treated-----?-- Yes.

-----by Professor Epstein and we're told by him in evidence that he treated successfully and that ablation technique would mean that the arrhythmia was fixed?-- Yes.

He was satisfied about that. From a cardiologist's perspective I ask you to accept that the evidence from Professor Epstein is that if there is a cause of death we shouldn't be looking at the cardiovascular system?-- Yes.

Is that advice to the Coroner consistent with your findings at autopsy?-- It is, yes.

When we look at the toxicology, and that's on page 4 of your report I think it is? You tell us there that there's no alcohol?-- That's correct.

Can you please help us understand what the other findings are and what they mean?-- Well, some of these drugs have been used in the resuscitation.

Yes?-- But other drugs such as the Ibuprofen and Paracetamol, for example, are non-steroidal anti-inflammatory drugs.

Yes. Often used by women, as I understand it, during times of periods, this sort of thing?-- Yes.

But we don't know why she may have been taking that particular anti-inflammatory?-- Yes.

Would that have any significance at all clinically in terms of a cause of death?-- I don't think so, no.

Are any of those medicines relevant to understanding a cause of death?-- Well, obviously carbon monoxide is not a medicine and-----

Mmm?-----the level there is basically negative.

Yes?-- But none of the drugs mentioned are relevant to the death really. They're just relevant to what she's had for her own personal use and resuscitation treatment medicines.

Yes. Doctor, can I ask you to help us understand some of the mechanics? Is drowning something that occurs quickly or slowly?-- Well, there's two types of drowning really, dry drowning and wet drowning.

Yes?-- And with dry drowning it tends to be more common in the UK, we've got very cold water.

Yes?-- Sometimes a person can jump into the water and the effect of cold water on the back of their throat may cause a reflex cardiac arrest.

Yes?-- Whereas wet drowning a person tends to be found with inflated lungs, they're full of water and with the water in the lungs it - it pushes any air peripherally, so you get this hyper-inflated appearance to the lungs, and they call that aqua emphysema.

Right?-- That's wet drowning.

Yes?-- That's a classical feature and the lungs tend to cross in the mid-line.

Was that demonstrated for Tina at autopsy?-- Not particularly well, no. But microscopically I can see fluid in the lungs and this distension of uvula spaces which is this aqua emphysema that I've mentioned to you as a - at a macroscopic level. I've actually got a bit of a bad cold in my nose at the moment so, I'm sorry if my voice is a bit disturbed.

No, Professor, it is as it always is, calm and reassuring. Help us though with - with this; we need to have some understanding of how long a wet drowning, if that is the correct category for Tina, might take?-- It might take a couple of minutes.

Is it a quick process?-- It can be, yes.

What occurs during the drowning process?-- Well, water enters the airways in the lungs basically.

Yes, and what impact does that have on other organs, ones ability to attend to things, eyes, can you help us at all with that?-- I can't help you too well with that, no.

All right, okay. In terms of deprivation of oxygen, is that a potential underlying cause here for this drowning?-- Well, I don't have any good evidence of that.

What----?-- And I - I would find it hard to demonstrate at autopsy deprivation of oxygen.

Mmm, mmm, why is that?-- Well, because it's very different to

biochemical studies on post mortem tissues, they don't accurately reflect what occurs in the living patient.

Would it be fair then to say that what you're able to demonstrate at autopsy is a drowning, you can find no medical underlying cause for that drowning?-- Yes.

And am I right in assuming that your advice to the Coroner is that he needs to consider non-medical causes for this drowning?-- That's correct?-- That's correct, yes.

But in terms of what those causes may be, it's your view that it's really beyond the competency of a forensic pathology - pathologist to - to really try and speculate on what that might be? -- Well it's beyond my competency, yes.

All right. Would you just pardon me for a moment, your Honour? Thank you, your Honour, I've nothing further.

MR ATKINSON: Thank you, your Honour.

CORONER: Thank you. Mr Atkinson?

MR ATKINSON: Professor, my name is Atkinson, I'm the barrister for Mike Ball Dive Expeditions? -- Good afternoon.

There's only - good afternoon, there's only one issue I wanted to ask you about. You speak in your statement about gas embolisms and you've spoken with my friend about them? -- Yes.

Can you explain what one is and how it occurs? -- Well, as you - are you a diver yourself?

I - I'm a diver but - but not an instructor. Well, as far as I'm concerned, it's - it's because if you go down underwater you're - say you're down at 30 metres, you may have a pressure of four atmospheres. So as you come up to the surface you go from four atmospheres of pressure to one atmosphere, so gas bubbles tend to emerge from the tissues.

And what's supposed to happen, I understand, is that if you go up slowly your lungs process the gas so that embolism doesn't develop? -- That's correct, yes.

So the main way to develop an embolism is - is ascending too quickly? -- Yes.

Can you develop embolism from going down too quickly? -- I'm not sure about that.

Right. Now, in your statement, Professor, you say that although there's extensive gas embolism your view is that a - a spin-off, if you like, of the rescue attempt rather than what happened underwater prior to that? -- Yes, I felt it was an artefact of being rescued very promptly.

In - in other words, from a swift ascent? -- Yes.

Could it be a - a result of mouth to mouth resuscitation? -- It seems unlikely to me because I obviously see a lot of people who are given mouth to mouth resuscitation and gas embolism doesn't seem to be a feature of that.

Mmm. And although I note you say that the gas embolism is extensive, one feature I'd like you to assume is that the rescuer who brings Tina up, presumably he would have some gas embolism himself but----?-- Yes.

-----he - he - he wasn't detrimentally effected. Does that tell you that the - the level of gas embolism of itself wasn't particularly acute? No, I shouldn't use the word "acute", severe. And during the - during the time when Tina was alive?-- Well, it's severe enough that it seemed quite - my report mentions the CT scans. You know, the gas is seen quite easily in those scans and that, to me, suggests fairly severe. It may be that rescue diver has some experience and aptitude to coping with - with that degree of embolism.

And I guess also if you're breathing freely as you - as you ascend-----?-- Yes.

-----you're less likely to be exposed to embolism?-- That's right, yes.

Thank you. Nothing further, Doctor. No.

CORONER: Mr Walters.

MR WALTERS: Doctor, the process of breathing removes the gas from the bloodstream; does it not, as you're ascending?-- Yes.

Doctor, I represent Tina's parents, the deceased's parents?-- Yes.

Doctor, I have a theory based upon the evidence that the - during the dive of Tina with her husband, during the course of that dive, her gas supply or oxygen supply from the tank was turned off?-- Yes.

And during the process that it was turned off she struggled dislodging the mask of the person who was holding her, causing her to be released, wherein she descended to some degree then that person took hold of her, again holding her from the front with the arms around, this person being much larger than she, and as a result of that the breathing apparatus in her mouth was pressed up against that person's chest preventing it from being spat out as is often the case in these scuba diving incidents of persons who are suffering oxygen deprivation and subsequently the person holding her has seen some other divers who have arrived on another vessel which he did not know about and he has turned the air back on in that position and suddenly left the scene causing her at this stage to descend to the bottom of the ocean. Now, Doctor, I'd like to explore some of the possibilities of this theory. Of advantage, Doctor, the divers, including the rescue divers, all have computers which plot their time and position and depth in the water. If I can just show you something for a moment. On this device here, Doctor, this graph here which forms of this graph here is said to be the deceased. This other graph here accompanying it and then departing is said to be the other diver with her, her husband. This graph here is the rescue diver which joins back up with her. Doctor, the air embolism which you saw within her bloodstream, would that be distributed more within the body by the fact that there was manually applied to her for a lengthy period of time resuscitation attempts and I think the estimates put it at probably between about 35 and 41 minutes. Would - would that help distribute that within the body if - if it

had occurred?-- It helped release some of it-----

Yes?-----because I've mentioned there are artefacts here that cause problems. One of the artefacts being the - the rescue gas embolism?-- Yes.

And the artefacts being the resuscitation itself where there are punctured vessels in the neck-----

Yes?-----to bled out and obviously those vessels can not only bleed but they loose gas too.

Yes. And those punctures were from the - there were actually some qualified doctors attempting-----?-- Yes.

-----to resuscitate her. They arose from that?-- Yes.

I also understand that there were some attempts in relation to needles being put into the - the lungs towards the last minute to try and remove fluid or - or - or air or something of that nature. Would that have any effect upon that?-- Yes. All these things are contributory.

Yes?-- And, you know, there are artefacts basically that make things a bit hard to interpret.

See, Doctor, the computer graph here, and I'm just looking from an old textbook which I was reading the other day that speaks about what often is the injuries which occur to an inexperienced diver, where the - where it's quoted, "Such deaths", and then they're talking about cerebral arterial gas embolism-----?-- Yes.

-----it says,

"Such deaths are most likely to occur with inexperienced or untrained divers following uncontrolled descents sometimes from relatively shallow depths, such as two or three metres, without exhalation or re-breathing. Such situations are most likely to occur where there has been panic associated with some fright or equipment failure.

Pulmonary barotraumas is a classical manifestation of Moyle's law which states that at a constant temperature the volume of gas inversely proportional to the pressure.

Development of pulmonary barotrauma is due to gas already present in the lungs at the depth of the diver. The gas expands as the ambient pressure falls when the diver rapidly ascends. There is no reflex drive to exhale in such a situation. The diver in an emergency - in an emergency ascent must continuously and continuously forcibly exhale, especially during the last few metres of ascent. Pulmonary barotrauma produces chest pain, dyspnoea",

is that - D-Y-S-P-N-O-E-A?-- Dyspnoea.

Yes. "Cough [indistinct] and at a later stage clinically perceptible intestinal emphysema." The interesting point, Doctor, if that was to have been a cause of death, is that there is, on this particular case, nothing recorded by the computer to show a rapid ascent prior to the young woman being found lying essentially dead, to all intents and purposes, by the person who has taken her rapidly to the surface?-- Yes.

So-----

MR ZILLMAN: Well, I object to that. I suppose I should put it on this basis: it's a provisional objection, your Honour. My recall of the evidence given by Detective Campbell was that there may be up to 10 feet in ascent which is not recorded on the computers, so if I'm correct in that, the question is certainly objectionable, unless my memory-----

MR WALTERS: My recollection is that it's the husband's computer, not the wife, but I could be corrected upon that.

CORONER: Yes, I think it related to the husband's computer because that was a question relating to it, but aren't these computers the same?

MR WALTERS: Your Honour, I'll make some enquiries on that. I accept my friend's object on that and if we could qualify that to that point, but in any event, Doctor, recorded there is, if there was a rapid ascent and that is correct in relation to that, the only variable would be that if there has been any rapid ascent, it's less than 10 feet, if that is correct. Did you see anything of the nature of pulmonary barotrauma to this woman?-- I didn't see any tearing of the lungs, no.

No. Now, Doctor, there is report, and it seems to come both from the persons on the surface and also some other divers who saw her during the time of the attempted rescue, when she's been taken to the surface, of there being some blood, I think, trickling from either the mouth or the nasal region. As I understand that, that can in fact be as a result of the mechanics of the inhaling of the water into the lungs; is that right?-- Possibly, yes.

Doctor, if her lungs had a lot of water in them, the extended attempt to resuscitate her on the surface would remove a lot of that water?-- Yes, it would. Perhaps I could just clarify something else too.

Yes?-- Some cases of stabbing to the neck are accompanied by air getting into the arteries of the brain, and I see that not infrequently.

Yes?-- And the same type of thing has happened here, to some extent, because of resuscitation.

Yes?-- The vessels in the neck being punctured.

Yes?-- So these artefacts make things very tricky to interpret what bubbles in arteries mean.

Doctor, the two gentlemen who initiated the resuscitation and seemed to be under the direction of the doctors who carried out the manual pumping of the heart through the chest and the breathing

are both trained in resuscitation and have some qualifications in that regard?-- Sure, I'm not - not criticising-----

No, no, what I'm saying is neither of them note at the time of commencing that that they could detect an actual heart beat. Does that have any impact at all on - on this matter?-- Well, I just want to draw your attention to the fact that the neck of the deceased is very swollen-----

Yes?-----and it's very swollen with haemorrhage-----

Yes?-----and really you need to have - I suppose it might be just the fact of the resuscitating the heart, you need to have some kind of circulation in the neck area to drive that haemorrhage out and it's quite profound swelling in the neck.

Yes. Even if - even if clinically she was dead, the manual attempts to resuscitate her would continue that occurring, would it not?-- Yes.

Doctor, the haemorrhagic oedema fluid in a wet drowning, that is present throughout the airways, the mouth and the nostrils?-- Yes. It's usually a foam. It is sometimes haemorrhagic but not always.

And, in fact, here one of the gentlemen carrying out the mouth to mouth speaks of having to wipe fluid and this sort of thing from his face on a regular basis. Would that be indicative of that type of substance?-- Yes.

That fluid will at times have within it blood?-- Yes, it's very - very common to have blood, but most of the time you don't have, you just have foam in drowning.

The blood which is seen coming from that woman's nose, and I'm not sure if it's the mouth; I recall now the nostril, what - what would be likely to cause that?-- Well, she may have damaged the inside of her nose perhaps.

Okay. Excuse me for a moment, your Honour.

CORONER: Could that come from any injuries to the throat during the course of-----?-- Not usually, your Honour, no.

Even during the course of resuscitation?-- Well, I'm not sure if they've tried to intubate the deceased, but intubation might perhaps damage the back of the throat, but it wouldn't damage the inside of the nose normally.

Doctor, the effect of salt water within the lungs, as I understand it, in persons who drown, they reach a point where they involuntarily breathe in water or take in water; is that correct? Is that a mechanism that occurs? Even if they're holding their breath, they make a point where they have to inhale?-- It's very hard to answer that accurately for me. I - I can describe the symptoms of drowning perhaps-----

Yes?-----but I'm not too sure what people experience as they're drowning.

Yes. The - the water in the lungs would come about from a person trying to breathe in air and,

there being no air, water would come in?-- Yes.

Once that salt water is - is in the airway, what does it do?-- Well, it affects - it's affected by gravity, so it just goes as far down as it can really-----

Yes?-----if a person's head up.

Yes. How long does the - does that process go on for where the - the water is drawn into the lung?-- Well, probably a few minutes, I would think.

Of course, the - the very nature of a liquid as opposed to a gas would have a very different effect within the lungs?-- Yes.

Does that in itself cause any damage?-- Well, the main problem is that you're not breathing in the normal air that you breathe in. It's displacing air with water.

Yes?-- It's not necessarily going to give you any immediate reaction in the lung itself.

Yes. Doctor, there was also mention by some persons of there being vomitus or - or vomit had come up from the woman. Is that a - a symptom of this type of mechanism that occurs at - at the time of drowning?-- At drowning it's very common for people to swallow water, yes, and that gets regurgitated as what appears to be vomit.

Yes. And in fact it's water with stomach contents; is it?-- Yes.

What - what was the nature of her stomach contents at the time of post-mortem?-- 120 mils of brownish coloured fluid which has no obvious smell.

Yes. So, there was nothing in the form of - a solid form within that fluid?-- No.

Thank you. I have no further questions.

MR ZILLMAN: Could we just have a short break, your Honour, I just need to get some instructions from my solicitor.

CORONER: Yes, certainly.

MR ZILLMAN: Not very long.

CORONER: Please feel free to walk around, Doctor, we'll adjourn for a few minutes.

THE COURT ADJOURNED

THE COURT RESUMED

DAVID JOHN WILLIAMS, CONTINUING EXAMINATION:

MR ZILLMAN: Doctor, you - you took certain samples and specimens for the purposes of analysis; is that right?-- I did, yes.

Including some blood?-- Yes.

That, at least, was analysed for the purposes of ascertaining what drugs might have been in Tina's system?-- Yes.

Beyond that though can you tell me if there were any biochemistry tests done of the blood?-- No, there weren't and-----

MR ZILLMAN: I beg your pardon, I couldn't hear you sorry?-- No, no, there weren't and I mentioned earlier on that bi-chemical tests on post-mortem blood are notoriously unreliable.

I see, all right. Another discrete topic is this. We've heard some evidence concerning arrhythmias?-- Yes.

Is it true to say that if a patient has - had an arrhythmia and subsequently there are further complications and the person dies as a result of that a post-mortem cannot detect in any way the presence of an arrhythmia?-- That's correct, yes.

To look at the exclusion of an arrhythmia in this case we must go elsewhere, that is beyond the post-mortem?-- Yes.

Now, there was some evidence of the ingestion of water into the lungs; is that right?-- Yes.

But it take it the lungs, on examination, did not then disclose the presence of any significant body of water?-- Well, the - the lungs - I'll just check the - the weight of the lungs. The right lung weighs 630 grams and the left 520 grams, which - and those weights are a bit too high. They're not quite - normal would be less than that really.

Well, how much less?-- Well, normally the right lung weighs between say 400 and 500 and the left lung weighs between say 350 and 450.

Okay. Now, just remind me what was the - the right lung?-- The right lunch is 630.

So, that's 130 over the top of what you'd otherwise regard within the range of normal?-- Yeah, right lung 630 and the left 520 and I've said that the lungs show moderate pulmonary oedema with areas of congestion. They don't cross the midline and peripheral displacement of air is not a

feature.

All right. Well, oedema might result in the lungs weighing more than you might otherwise have expected?-- Yeah, but oedema is just fluid, you know, so you get fluid in the lungs from drowning so I don't distinguish between pulmonary oedema due to drowning or due to heart failure.

I see, all right, okay. Whatever it be there is some evidence, at least, that she inhaled some water?-- Yes.

The high level of gas that you did detect was indicative to you of embolism; is that right?-- Yes.

And that, you thought, may well be explicable by the complication of the - the rescue?-- That's right, yes.

That is her rapid ascent from the floor of the seabed-----?-- Yes.

-----to the surface?-- Yes.

Tell me this, Doctor, have you seen the report of Dr Griffith?-- Dr Griffith, no, I haven't.

Can I suggest to you that Dr Griffith expresses the opinion that the gas that was detected was due to what might be called off gas. Do you understand that proposition that I'm putting to you?-- Yes, the gas coming out of the tissues some time after death.

Post-mortem, yes?-- Yes.

That, on its face, at least is at odds with your opinion; correct?-- Yeah. Sorry, did you say "at odds".

I beg your pardon "at odds"?-- At odds?

Yes?-- Well, perhaps.

Or a combination of-----?-- I'm not really against that explanation. I feel that this is a gas that's in her system as an artefact.

Well-----?-- And I - I have suggested the artefact is due to either ascent too quickly plus or minus the affects of resuscitation.

Yes. As I - as I read Dr Griffith's report, however, and we've heard to hear from him he rejects the proposition that the embolism - there was gas embolism due to rapid ascent?-- Okay, mmm.

It may be of assistance to you and to all of us then, in light of you not having seen the report, to ask you for your comment, might the - I don't know if it's been tendered, your Honour.

CORONER: It has been but we'll give a copy to the doctor now. It's part of the exhibit.

MR ZILLMAN: Can I refer you-----?-- Thank you.

-----particularly to the second page and I don't know if there's - I think there is a number in there - there's no numbering I'm told, it'll be the second paragraph on the second page; do you see that?-- On February the 14th?

We might have different copies here. No, the second page.

CORONER: You might have the pages out of order, Doctor. Could you just check those pages please? What does your paragraph start as, Mr Zillman?

MR ZILLMAN: No post-mortem - well, the second paragraph commenced, "No post-mortem" - the third paragraph, I apologise, the third, "No post-mortem".

CORONER: He's got two page 3's and not a page 2.

MR ZILLMAN: Have you got the paragraph now commencing "No post-mortem"?

CORONER: No, no, he's got to get them.

MR ZILLMAN: Still searching.

CORONER: Have you got a - take my copy. You might find it quicker than I will.

WITNESS: So page 2.

MR ZILLMAN: Yes-----?-- and the second paragraph?

Third I - I apologise-----?-- Third.

No post-mortem evidence, do you see that?-- Yes.

All right. Could I invite you to read that?-- Yes, mmm-hmm.

Just for the benefit of the [indistinct] I'll read it onto the record, "No post-mortem evidence would be available to [indistinct] defect or death due to an abnormal cardiac rhythm." I think we've already agreed on that much at least?-- Yes.

It continues, "The post-mortem reports under Doctor David John Williams on June 10 2004, makes reference to evidence of gas embolisms throughout Christina's body. This finding is likely to be a consequence of the attempted cardio pulmonary resuscitation that Christina received upon retrieval to the surface together with the post-mortem release of nitrogen gas bubbles into her blood vessels from her stored body tissue gas from air absorbed greater than atmospheric pressure whilst breathing underwater." Do you follow - see that?-- I do, yes.

Now, what I'm wanting to ascertain is whether you agree or disagree with those conclusions?-- I

agree with the - those conclusions.

All right. Well, maybe I've misunderstood things, I understood there to be a distinction in terms of the presence of the gas having come from the embolism occasioned by reason of rapid descent as against being attributable to events on the surface?-- Well, that's because I've tried to figure out why all this gas is there.

Yes?-- I've - I've looked at this case and I've said there's resuscitation and there's also a very fast descent. Is that why there is all this gas there? And Dr Griffiths has explained to me some of his experiments on animals which have been drowned and how this gas is released and I think it's fair to say that not many pathologists know of this mechanism. Certainly I didn't know about that mechanism.

All right?-- But having said that I've - I've done several autopsies on people who have died while scuba diving and this is a case that is particularly dramatic to me in terms of the amount of gas in the system.

Well, in that regard, there - perhaps - perhaps could be explicable in - in this way, would you agree, that the resuscitation attempts in this case, added to the level that you otherwise might have been seen?-- Yes.

So, there - in effect, would be a combination of the - of the two causes?-- Yes.

Right. You did make mention that it's desirable to have a CT scan at an early time rather than not?-- Yes.

If - can I suggest this, if there's a CT scan taken up to a period of say - within the eight hour period of drowning, one might be confident in then being able to attribute the gas to the embolism rather than it being attributable to other causes?-- Yes.

But your post-mortem examination was conducted, I think, about 22 hours after the event?-- Yes.

Which may have then in turn for you, a - a difficult task to attribute the gas to one cause or the other?-- Yes.

Okay. But you might have been confident if you'd done it - and I'm not being critical of you or anyone else in that regard, but had it been performed within the eight hour period, you might have been confident in attributing it to the - the rapid sink?-- Yes. I felt there was a [indistinct] though.

I beg your pardon?-- I felt this gas was an artefact anyway though.

Mmm. Right. The - an embolism actually can result in an ascent of - as - as little as .8 to one metre, would you accept that?-- Yes, I would.

And as a general proposition, would you accept this much, a cerebral arterial gas embolism with or without a pneumothorax, must be the first diagnosis in a oppressed gas diver who surfaces and becomes unconscious, is that a fair-----?-- Where - where are you quoting that from?

From a - a report that I had which I'm simply asking you to accept or reject?-- Well, I accept it,

yes.

All right. Okay, I'll just put that aside for a moment. I - I was unsure on - on some evidence you gave concerning the profound swelling to the neck area?-- Yes.

What - what did you conclude from that that there was such profound swelling?-- Well the swelling is caused by release of blood into the tissues in the neck and it's - it's quite dramatic finding----

Yes----?-- in this case. It's something I haven't really encountered before and obviously I see a lot of people who are resuscitated?-- Mmm.

Is it something you have never seen before?-- Not as dramatic as this, no.

Are you able to offer an explanation as to why it might have been so profound then?-- Well, presumably because the resuscitation was for a fairly extended time, and there's damage to vessels in the neck.

Would that perhaps be explicable in this way that whilst you might have seen other persons who have died after resuscitation attempts but it didn't - those attempts didn't extend to puncture of blood vessels?-- Well, it's very common to puncture vessels as part of the resuscitation.

I - I was just thinking perhaps of those cases where a person wasn't trained to----?-- Yes.

----to puncture the vessels. So, in other words not - a non medical person might be attempting the resuscitation attempts----?-- Sure.

----and there wouldn't be a - a puncture. But there are sufficient you've seen where there was a medical person endeavouring the resuscitation and therefore there were punctures?-- Yes.

So is the - the summary of - of that as it were, you just don't know the reason for it?-- No, I don't.

Okay. But did it or did it not indicate that there was circulation - that is the profound swelling at - at that point?-- It seemed to indicate to me, yes. But there again I presume that if you've got somebody squeezing the heart and allowing blood to flow, it'll flow out of punctured vessels in the neck.

Even though there wasn't circulation? In other words, the circulation----?-- It's artificial.

----it was - it was artificial?-- Artificial circulation, yes.

All right. But that again must have happened in other cases in - in similar circumstances?-- Not quite as dramatic as in this case, yeah.

Can you assume this much, that there is some evidence that when Tina was being brought to the surface there was blood - whether it be from the nose or mouth we're not sure but in that area at least, can you advance reasons for that putting aside trauma. In other words that she's got a bump on the nose or the mouth or whatever, but is that something that might be associated with embolism or hypoxic insults what have you?-- Either just linked to other trauma or some perhaps

some tendency on her part to have a - a nose bleed perhaps.

Okay. But it's not something that ordinarily is associated with a - a person who - who drowns?-- Not usually, no.

Okay. Vomit or what is described to be vomit, is sometimes as you say actually water that's been expelled from the - the body; is that right?-- Yes.

And - and foam is - I apologise?-- That's okay, no problem.

The foam, is that something you just simply associate with water----?-- Yep.

----or something beyond that?-- Water and air make foam.

Fair - fair comment, okay. So, that's indicative of an ingestion therefore of water into the lungs?-- Yes.

All right. I suppose actually it's any liquid as against water and air, is that so?-- Sorry?

Or not any liquid but other liquids as beyond water as well?-- Other liquids as well, yes.

Right. Just excuse me? Yes, thank you, Doctor, I've got nothing else?-- Thank you.

CORONER: Thank you. Yes, Mr Tate?

MR TATE: Professor, if I can just sort out a few things in my own mind, there was some discussion about post mortem off gassing as a mechanism, one mechanism, of explaining the finding of gas within the blood vessels of the body?-- Yes.

And that that process can be well established by eight hours; did I understand you to agree with that as a possible complicating factor in terms of trying to understand why the level of gas found at post mortem was so striking?-- Yes, I - I agreed with the proposition.

Mmm, mmm. There's been a number of questions put to you about various theories and various processes, having had an opportunity of considering all of those questions, are you still of the same opinion that at post mortem you were able - unable to demonstrate a cause of death arising from natural causes, the presence of a natural disease or a disease process?-- Yes, I was unable to find a natural cause of death for the deceased.

Mmm, all right. Professor, thank you. Thank you, your Honour.

CORONER: Thank you. Anything further, gentlemen? Thank you very much for your time, Doctor----?-- Thank you, your Honour.

----Williams, I think you might need to return Doctor Griffiths----

MR ZILLMAN: Could I just ask a question-----

CORONER: Oh yes, certainly.

MR ZILLMAN: -----before he goes?

CORONER: Yes, certainly.

MR ZILLMAN: That's just arising out of that.

CORONER: I was just going to actually say that Doctor Williams is available local and if matters arise we'll deal with that now but-----

MR ZILLMAN: All right, thank you.

CORONER: -----if there are matters I'm sure he'll be available by telephone if others needed him for something else.

MR WALTERS: Your Honour, I - I have one matter which perhaps I - I'd like to raise with the Doctor.

CORONER: Well, let Mr Zillman do that.

MR WALTERS: Yes.

CORONER: Because - and then we'll see what - what do you want, Mr - it's your train of thought-----

MR WALTERS: It may be a matter-----

CORONER: No, just a minute? It's just a train of thought-----

MR ZILLMAN: I'm easy.

CORONER: Okay, well, you - you proceed, Mr Walters, then.

MR WALTERS: Yes. Doctor, I was just looking in the text book of - and I appreciate it's a little old now, Ethics, Legal Medicine and Forensic Pathology by Plueckhahn and Cordner 1991 Melbourne University Press, and they talk at page 267 of this; autopsy findings, "The presence of bubbles does not necessarily mean that the diver has died from decompression illness. Bubble formation from gaseous solution is a physical rather than a physiological event and will occur after death in a diver brought to the surface from death or taken from a pressurised environment in a decompression chamber. Putrefaction can also cause bubble formation but should not be recognised by an experienced prosecutor. It is most important that post mortem examinations in diving facilities are complete and performed by experienced prosecutors." I need not go on but could that bubble formation you spoke of have occurred even if she was already dead at the

bottom and brought to the surface?-- Yes.

Thank you.

CORONER: Mr Zillman?

MR ZILLMAN: Yes, thank you. Your last answer I think to Mr Tate was to confirm his proposition and which was you were unable to demonstrate death from a natural cause, do you remember that?-- That's correct, yes.

But that does not mean to say that therefore the death was not from a actual cause, is that fair to say?-- That's fair.

In other words the negative doesn't make a positive?-- No.

All right. It is conceivable that a person may get into some form of difficulty in the course of the dive leading to unconsciousness, leading to hypoxia, leading in turn to an embolism and it not be able to be determined on post mortem?-- That's correct, yes.

Thank you.

CORONER: Mr Tate, you got any questions?

MR TATE: No, your Honour.

CORONER: Thank you-----?-- Thank you, your Honour.