SOUTH PACIFIC DIVERS

NEWSLETTER

WET RAG

JANUARY 1986

President:	John Blaszczak	Photographic Officer:	Terry Mansfield
Treasurer:	Ross Hipwell	Social Secretaries:	Miriam Roberts
Secretary:	Audrey Mansfield		Rhonda Gale
Dive Organiser:	Gary Roberts		Karl Krieter
		Publicity Officer:	Cindy Belveal

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1986 is now well upon us and this must be the best time of year to get into the water.

The weather and holiday season has lured divers back to the sea - even some of those who weren't at all sure if their expensive equipment still worked!

I'm sure all of whom took the plunge enjoyed themselves whether it was a "good" dive or not.

It looks like a few more club members are getting their boats back in the water and the rock hops seem so popular the coastal shores appear to be crowded with black and blue lemmings.

Anyway, S.P.D. will be doing its best to provide a variety of venues, both diving and social, throughout the year to try to suit everyone. If anyone would like to share a favourite dive spot with the club - perhaps a new discovery over Christmas - bring it up at the club meetings and see if something can be arranged for other members to join in - I know most divers enjoy a new area to explore.

By the way, we'd like to thank Miriam and Gary Roberts for having us all over to their house for the '85 Christmas party and with the help of Karl and Rhonda made a nice night for the rest of us - A special thanks to Rhonda who saved a life that night.

Enjoy 1986!!!

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D I V E S

February dives are for the more adventurous:

Sunday Feb. 2: Dive the Tuggerah. Meet at Dolan's Bay at 9am.

Sunday Feb. 23: Dive on the Dunbar. Meet at Rose Bay at 9am.

Anyone wanting more information on these dives please phone Gary Roberts on 771 3459 and please let him know the evening before the dive if you will be going along.

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S O C I A L

Miriam, Rhonda and Karl have organised the following for the rest of January and February:

January 25 to 27: "Tuglow Caves Weekend". For those who haven't been up with Terry & Audrey Mansfield before it is a very pleasant way to spend the weekend. We usually meet at OBERON on Saturday morning and travel togethr into the Caves to set up camp by lunchtime. A few days of R & R, a little wine ..... who knows. Anyway it a nice weekend and if you're interested in going have a chat to the Mansfields (628 8172) or Miriam (771 3459).

Friday January 31: How about a night at the movies! Meet at Beverly Hills Twin Cinema at approx. 7pm for "A View To A Kill" (the new Bond movie). After the picture we will continue on to dinner at the Rhinedorf, a little German Restaurant in Beverly Hills. The theater tickets cost $6 each but there is a discount for groups over 10 or 20 people, so if we get a group together we can organise that. As for dinner, we have to book, so please let us know you are coming no later than Friday 24th.

Sunday February 2: Picnic Day at Jibbon Beach. This will be a family picnic day at Jibbon, so bring the dive gear, lunch and don't forget the family. We'll organise a few things to do. See the Dive Calendar for meeting details or talk to Miriam or Gary Roberts.

COMING UP: Saturday March 22 - Australia's Wonderland. We thought a family day at this new fun park would be the go. I'm sure we don't need to go into too many dtails after all the advertising. We'll get a group together and spend the day. Let us know if you'd like to go and we'll work out a few more details.

Saturday April 26 - "Le Champagne". Dinner out for all you conniseurs. This is a nice little restaurant in Fairfield. The menu is set price (about $15) and it's licensed. Again I need to know numbers in order to make the reservation, say, at least one week in advance.

DANGEROUS AREAS DUE TO UNEXPLODED DEPTH CHARGES

No.	Locality	Chart	Position of Centre of Area — Latitude S.			Longitude E.			Radius of Area in Miles	Depth of Water in Fathoms	Other charts temporarily affected
			°	′	″	°	′	″			
1	Yampi Sound, W.A.	Aus. 40	16	06	57	123	36	51	0.5	16	Aus. 731-733
		BA. 1043	16	06	54	123	36	38	0.5	16	BA. 1206
2	Yampi Sound, W.A.	Aus. 40	16	05	35	123	35	20	0.5	6	Aus. 731-733
		BA. 1043	16	05	32	123	35	07	0.5	6	BA. 1206
3	East of Monte Bello Is., W.A.	Aus. 742	20	23	02	115	39	57•	0.5	25	Aus. 327-328
		BA. 1055	20	23	00	115	39	30	0.5	25	
4	N.W. of Anchor Island, W.A.	Aus. 744	21	29	00	114	39	42	0.5	34	
		Aus. 328	21	29	00	114	40	06•	0.5	34	
5	N.W. of Rottnest Island, W.A.	Aus. 334	31	45	12	115	13	12•	0.25	55	
		BA. 1033	31	45	00	115	14	36	0.25	55	
6	N.W. of Rottnest Island, W.A.	Aus. 334	31	47	30	115	14	18•	0.25	65	
		BA. 1033	31	47	24	115	15	54	0.25	65	
7	N. of Rottnest Island, W.A.	Aus. 112	31	58	19.5	115	32	01.5•	0.25	9	Aus. 114-334
8	Port Phillip, Vic.	Aus. 158	38	13	58	144	49	39•	0.25	13	Aus. 143
9	Port Phillip, Vic.	Aus. 158	38	11	35	144	51	55•	0.5	13	Aus. 143
10	Port Phillip, Vic.	Aus. 143	38	08	54	144	50	35•	0.25	13	
11	Bass Strait, Vic.	Aus. 801	39	05	44	146	45	05	0.5	30	BA. 1695A
		Aus. 357	39	05	36	146	45	05•			Aus. 350
12	Bass Strait, Vic.	Aus. 357	39	38	06	146	46	30•	0.5	39	BA. 1695A
13	Wreck Bay, N.S.W.	Aus. 807	35	15	30	150	38	00	0.5	24	BA. 1020
14	Wreck Bay, N.S.W.	Aus. 807	35	15	13	150	41	20	0.5	41	BA. 1020
15	Wreck Bay, N.S.W.	Aus. 807	35	12	00	150	38	00	0.5	10	BA. 1020
16	Jervis Bay, N.S.W.	Aus. 193	35	06	41	150	48	07•	0.5	18	
		Aus. 807	35	06	42	150	48	12	0.5	18	BA. 1020
17	Shoalhaven Bight, N.S.W.	Aus. 808	34	53	12	150	57	48	0.5	50	BA. 1020
18	Shoalhaven Bight, N.S.W.	Aus. 808	34	52	00	150	58	00	0.5	48	BA. 1020
19	Shoalhaven Bight, N.S.W.	Aus. 808	34	50	00	150	59	00	0.5	54	BA. 1020
20	Tom Thumb Islands, N.S.W.	Aus. 195	34	27	37	150	55	48•	0.3	4	
		Aus. 808	34	27	37	150	55	44	0.3	4	BA. 1020-1025
21	N.E. of Bulli, N.S.W.	Aus. 808	34	18	00	151	03	00	0.5	23	BA. 1025
22	E. of Wattamolla, N.S.W.	Aus. 808	34	10	00	151	15	00	0.5	65	BA. 1025
23	Port Jackson, N.S.W.	Aus. 201	33	50	27.5	151	16	17.5•	0.05	6	Aus. 200
24	Port Jackson, N.S.W.	Aus. 201	33	50	35	151	16	19•	0.05	6	Aus. 200
25	Port Jackson, N.S.W.	Aus. 201	33	50	58	151	16	15•	0.05	6	Aus. 200
26	Port Jackson, N.S.W.	Aus. 201	33	51	02	151	16	13•	0.05	6	Aus. 200
27	E. of Broken Bay, N.S.W.	Aus. 197	33	34	45	151	27	33•	0.5	31	
		Aus. 809	33	34	54	151	27	36	0.5	31	BA. 1025
28	S. of Newcastle, N.S.W.	Aus. 207	32	59	10.5	151	48	47•	0.5	18	
		Aus. 809	32	59	10	151	49	00	0.5	18	BA. 1027
29	N.W. Channel, Moreton Bay, Qld.	Aus. 235	26	54	42	153	08	33	0.5	5	Aus. 365-814
		BA. 1029	26	55	08	153	09	50	0.5	5	
30	Moreton Bay, Qld	Aus. 236	27	14	24	153	15	40•	0.25	7	Aus. 814
		BA. 1029	27	14	22	153	17	00	0.25	7	
31	Cleveland Bay, Qld	Aus. 256	19	10	18	146	55	00•	1.0	5	Aus. 827
		BA. 348	19	10	12	146	55	08	1.0	5	BA. 2349
32	Fitzroy Island, Qld.	Aus. 830	16	55	21	145	58	42•	0.5	12	
33	Cape Grafton, Qld.	Aus. 830	16	51	18	145	54	12•	0.25	4	
34	N. of Cape Grafton, Qld.	Aus. 830	16	47	18	145	55	18•	0.25	17	
35	N. of Cape Grafton, Qld.	Aus. 830	16	41	54	145	51	36•	0.25	18	
36	Approaches to Darwin, N.T.	Aus. 27	12	21	48	130	46	29•	0.5	7½	Aus. 308-309
		Aus. 722	12	21	51	130	46	24	0.5	7½	
37	Milne Bay, P.N.G.	Aus. 629	10	21	03	150	21	20•	0.25	7	Aus. 381
38	Milne Bay, P.N.G.	Aus. 629	10	20	32	150	21	21•	0.25	7	Aus. 381
39	Milne Bay, P.N.G.	Aus. 629	10	20	14	150	21	40•	0.25	8	Aus. 381
40	Blanche Bay, New Britain	Aus. 680	4	14	48	152	12	30	0.2	Var.	BA. 3553
41	Gazelle Hr, Solomon Is.	BA. 3420	6	30	06	155	11	54	0.56	Var.	

(Caution — Anchoring, trawling, or fishing is dangerous in the above areas.)
Positions marked thus • are based on AGD 1966 Datum.

Hydrographic Service, R.A.N. Sydney. *(A.H. 17/28.)*

SPUMS ANNUAL SCIENTIFIC CONFERENCE 1985

THE DEEP FROZEN DIVING PHYSICIAN

Carl Edmonds

Introduction

I was scheduled to lecture on diving environments, but the abbreviated time available has obliged me to reduce the extent of the lecture. I have decided therefore to discuss only one environment, which greatly appeals to me, and discuss the lessons which have been learnt from it. The environment that I wish to share with you is that of the Antarctic.

The Antarctic is almost twice as large as Australia. It is the highest, driest, coldest, windiest continent on earth. This massive land mass has an ice covering which, if spread over Australia, would form a layer 2 km thick. If it should melt, the ocean would rise by as much as 60 metres, causing devastation to my harbourside home in Sydney.

Throughout the history of Antarctic exploration, Australians have cloaked themselves with honour. Names such as Sir Douglas Mawson, Sir Edgeworth David, Dr Forbes Mackay, and many others are entwined in the history and development of this magic land. Australia now lays claim to 40 per cent of the continent and modern day pioneers, geologists, engineers, biologists, metallurgists, meteorologists and physicians, staff our four permanent bases, three on the mainland and one on Macquarie Island. The Department of the Antarctic is responsible for administering these, whilst adventurers such as Dick Smith and Dr David Lewis add a touch of glamour and excitement to our involvement. The Oceanic Research Foundation is a privately run organisation that is determined to preserve our contribution to that continent.

My reputation in the world of diving medicine is unfairly associated with the development of a method of treating decompression sickness (bends) in remote localities. Specifically, this system involves giving oxygen underwater, and was devised to be used in the tropical waters of the Pacific Islands, an area which does not have a surfeit of recompression chambers. Most people would agree that the treatment is not appropriate to the colder waters of Sydney and Melbourne (where there are recompression chambers available).

It was therefore somewhat perplexing when I was invited to contribute to the development of a diving facility in the Australian Antarctic. Could my underwater oxygen treatment, especially designed for the tropics, be used in the event of a decompression emergency? As I am not an armchair researcher, there was only one way to find out. I packed my woollen undies, hot water bottle, guitar and windsurfer (the last item was denied passage on the otherwise serviceable vessel, the "Nella Dan"), but before embarking into the Southern Ocean, I decided to obtain advice about the potential problems of working in this region.

The information was gained mainly from the Department of the Antarctic, which has expertise in a whole range of scientific fields, including a most knowledgeable Department of Medicine, effectively run by Dr Des Lugg. I also received information from the US Navy, especially from their "Project Deep Freeze". Other data was obtained from some sleazy bars in Hobart, but this perhaps should be the subject of a different dissertation.

As I was travelling to the Antarctic in summer, I was to expect almost constant daylight, temperatures from between 0°C and -30°C, winds up to 100km per hour, waves up to 15 metres high and a sideways roll of the ship to approximately 100 degrees. Under such circumstances, the possibilities of frost bite, hypothermia, seasickness and hangovers were to be expected. Special clothing had to be worn to protect against the temperatures, the sun, blizzards and the effects of snow.

Vehicles wear out approximately 10 times faster in the Antarctic. Brakes often do not work, and handbrakes tend to freeze on if they are applied. Pedestrians are protected from hearing and seeing vehicles before the collisions, by wearing a large woollen hood. Cameras play silly games. I attempted to clean the lens by breathing heavily over it, as a prelude to wiping it with Kleenex. An almost transparent lens became totally fogged with ice crystals. Similar condensation occurs when the camera is taken from a warm environment to outside. The more intricate and complex the camera, the more likely the mechanism is to freeze. Batteries have a short life, and the cold, dry conditions result in film either breaking, if wound on too fast, or having static "flashes" on the negative due to the very low moisture content of the air.

Equivalent problems seem to occur with all other equipment. The low temperature changes the strength, elasticity and hardness of metals and reduces their impact resistance. Metal becomes so cold that, if touched without protection from gloves, it may freeze to the skin.

Leather, fabrics and rubber become rigid and break. Glass (being a poor conductor) may crack if exposed to the sudden temperature changes from the habitat to the environment. Lubricants must be specifically developed for sub-zero conditions, and static electricity affects everything, including hair, giving the expeditioners a rather startled and woolly appearance.

Injuries From Cold

The two major types of injury are frost bite and hypothermia. I intended to avoid both these by always staying indoors, overdressing, growing a beard (this allows an ice layer to form on the surface of the beard, enclosing an air space which gives good insulation and protection to the face), and following all the rules. I soon found out that the rules were frequently the opposite to what I had planned.

One of the most dangerous errors, and one likely to induce cold injury, is the wearing of excess clothing. When coupled with exertion, this causes sweating and increased heat loss, as well as a loss of insulation in the clothing when the sweat freezes or evaporates. Any sweat, water, snow or frost must be removed to prevent it wetting the clothing and reducing insulation. Even boots must be dusted off and hung up, never laid on the floor where they may get damp from the melted snow and freeze when re-exposed to the environment. One absolute requirement to prevent hypothermia and frost bite is to remain dry. Hardly encouraging advice for the aspiring diver.

The lips, nose and other protrusions, are particularly vulnerable to exposure, and need protection. Especially dangerous is the loss of gloves, mittens or headgear. These are often removed for various

reasons, only to be whipped away by the wind or lost down a ravine, so they have to be firmly attached to the rest of the clothing when the weather conditions are difficult. Wind, with its more terrifying cousin, the chill factor, aggravates any of these exposure conditions, and produces frostbite. Constant vigilance is needed in checking each other to ensure that the face is not affected (looking for ischaemic white patches). Each expeditioner is responsible for his own hands and feet.

Included in protection is the use of ultra-violet blockout skin preparations and good quality sun goggles (not those with the clear lower half, as most of the light is reflected upwards from the snow). Glasses do not work very well, as they tend to become fogged up by condensation from the breath. Exposure to the very bright ultra-violet light and its reflection from the snow, produces a painful and disabling "snow blindness". A "whiteout" is an entirely different phenomenon, but causes a similar inability to visualise the environment. It develops because of a diffuse shadowless illumination, against a white snow background. With blizzard conditions or clouds, the sun is not visible, and, as everything is covered with a bright white mat, it is impossible to perceive depth or discriminate articles or topography.

Diving Operations

There were U.S. Navy diving expeditions in the Antarctic as early as 1946. Their ability to operate in extremely cold waters (-1°C) has also been repeated by Canadian work in the Arctic circle and early Australian dives in the Antarctic.

Diving suits for the Antarctic need some special features. Almost every part of the body needs to be protected by the suit, so that only the lips are exposed - and these are covered by a thick layer of Vaseline, which can also be put over the beard to help form a seal with the face mask. Velcro is easier to use than zippers, which often freeze.

Three types of suits are available. The dry suit, which is made of closed cell neoprene and a nylon lined interior, is a one piece suit and can be inflated to produce an air layer over the body and ensure good insulation. Unfortunately, the valves on these suits are subject to freezing, and if the air inlet valve freezes in the open position, the diver faces a potentially hazardous and uncontrollable ascent to the surface. Most divers wear these suits.

Wet suits are also available and are made of foam neoprene, which produces an effective insulation for shallow dives. A small but invigorating trickle of water runs between the skin and the material when the diver immerses himself. These suits lose some of their insulation as the diver descends, because the air spaces within the neoprene tend to collapse. Because I had no other, I used this type of suit, and as it was very well fitting, it worked effectively for me. Non-compressible wet suits are available, but because of price can only be afforded by the Americans.

Dive Equipment

To breathe the air underwater, it needs to be decompressed via a regulator, from a high pressure (Scuba) cylinder. Then it is passed through a low pressure hose to a demand valve (mouth piece) where it is reduced again, to environmental pressure. This decompression results in a very severe drop of temperature, probably about -40°C, in the Scuba regulator.

Because of the very low temperature and the sometimes small amounts of water vapour in the compressed air, or water in the equipment, it is possible for the regulator to freeze up with ice particles. When this happens it either totally occludes the air supply or results in "free flow", a very large air loss which then "freezes" the low pressure part of the system, the demand valve at the diver's mouth. In either event, the diver loses his air supply and may be in a precarious situation if he is under an ice shelf or on a deep dive. Special cold-water regulators are available, the most sophisticated and expensive being that one that froze first!

Much of the other diving equipment was routine and caused no problems, but there were potential difficulties wherever there was a valve, and especially when there was a rapid flow of gas. Thus there were potential difficulties with buoyancy vests, which use either an air feed supply or a carbon dioxide cylinder attachment. The one bit of diving equipment we did not have to worry about was the compass. Colleagues supplied me with a compass with the needle fixed to read North, no matter which direction one turned the compass. An excellent modification for diving at the South Pole.

Results

With this background for disaster, it may interest people to know what major problems I encountered while diving on air and oxygen, using a wet suit and conventional diving equipment for periods of up to 75 minutes and at depths of up to 18m (60 feet).

The main reason for visiting the Antarctic was to test the underwater oxygen unit. I certainly tested it. I put it onto the oxygen cylinder, screwed it on with a spanner, and it snapped into two pieces.

Metal in the Antarctic is very fragile because it is so brittle with the reduced temperature. Here was a fairly average type medico, not particularly strong, breaking a stainless steel regulator, merely by turning it on! This had to be modified. We acquired an old oxywelding unit, and put that on the oxygen cylinder, and it worked wondrously well. Tony Dick was the Antarctic doctor when I was down there. We tossed up as to who would get the dry suit, and who would go on oxygen. The lucky person would achieve both. The loser would obtain the wet suit and compressed air.

Tony is still not sure if he won or lost. He used the dry suit and the oxygen, and I was dressed in a very routine type wet suit, fairly thick, and very tightly fitted.

The results were very informative. A dry suit, not closely fitting and not tailor made, tends to become compressed in its lowermost area and we were in the vertical position, it meant that Tony lost a lot of heat from his legs and lower abdomen. My wet suit was much more effective, and I really did not get as cold as Tony did. Thus the value of a well fitting suit.

It is true that Tony was probably a little hypothermic at the end of the dive, and he could not even be bothered taking his gear off when we were hauled on board.

The diving was sometimes spectacular, usually beautiful, and always interesting. There were irridescent blue ice caves to negotiate, free floating ice packs to dive under, and large irregular shaped icebergs floating by us. Hundreds of penguins,

demonstrating a speed and dexterity that they lack on the surface, joined us during the dives and welcomed their underwater visitors.

It is true that we encountered some minor problems with cold fingers and toes. To prevent this, we experimented with the CSIRO heat producing iron/magnesium sachets. Held in gloves and bootees, these produced enough warmth when contact was made with sea water to allow us to continue the dive. Although they look and feel almost the same as commercial tea bags, they produce only a luke warm beverage of inferior quality, very metallic and devoid of the tannin aroma.

These little heat producing sachets can also be interspersed through the wet suit, ensuring that the whole body is kept warm throughout the dive. If the particle size of the iron and magnesium is too small, excessive heat is produced and burns can be experienced to the skin.

With Antarctic diving, if Scuba gear is used, it is essential to have a line connecting the surface to the diver. It is of value in finding the body afterwards. It may even help the diver retrace his pathway, in the event of accidents. Another similar approach is to use a compressor with a surface supply. It works the same as the safety line, and ensures an adequate supply of gas. With either Scuba or the surface supply, a bale-out or pony bottle is essential.

It was not relevant in the summer diving, but in winter a real problem is to ensure that the hole in the ice is kept open. The water freezes over rapidly even though it is only zero degrees, because the air is at -30° or -40° Centigrade. In the Australian base we had a large shelter which protected the surface crew from freezing, and also allowed a heater to be used which tends to keep the ice hole open. The hole must also be capable of taking at least two people so that a rescue procedure can be conducted in the event of incapacity of one of the divers.

Diving is now being performed throughout the year, and if needed they can use the underwater oxygen unit for emergency treatment of decompression sickness. Of course, the ideal is to ensure that one does not get this illness, by remaining well within depth and duration guidelines.

There are other ways to keep warm, and these are very effective. If you wear a wet suit under a dry suit, this is the most effective. Another technique is to have a hot water supply similar to that used by the abalone divers, i.e. with that water being heated from the outflow of the compressor, and being pumped from the ocean around the outflow and then back down to the inside part of the wet suit of the diver. The degree of heat then is related to the gearing up of the compressor.

No-one goes to the Antarctic without falling in love with it. Everyone wants to go back, and many expeditions have been down there on numerous occasions. The attraction is in the beauty and majesty of the land. I was fortunate enough to exend the experience to include the underwater scene.

JANUARY 1986

Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday
			1	2	3	4
5	6	7	8	9	10	11
12	13	14	15	16	17	18
19	20 CLUB MEETING	21	22	23	24	25 TUGLOW
26 CAVES	27 WEEKEND	28	29	30	31 CINEMA & DINNER	

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FEBRUARY 1986

Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday
						1
2 TUGGERAH /JIBBON	3	4	5	6	7	8
9	10	11	12	13	14	15
16	17 CLUB MEETING	18	19	20	21	22
23 DUNBAR	24	25	26	27	28	

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