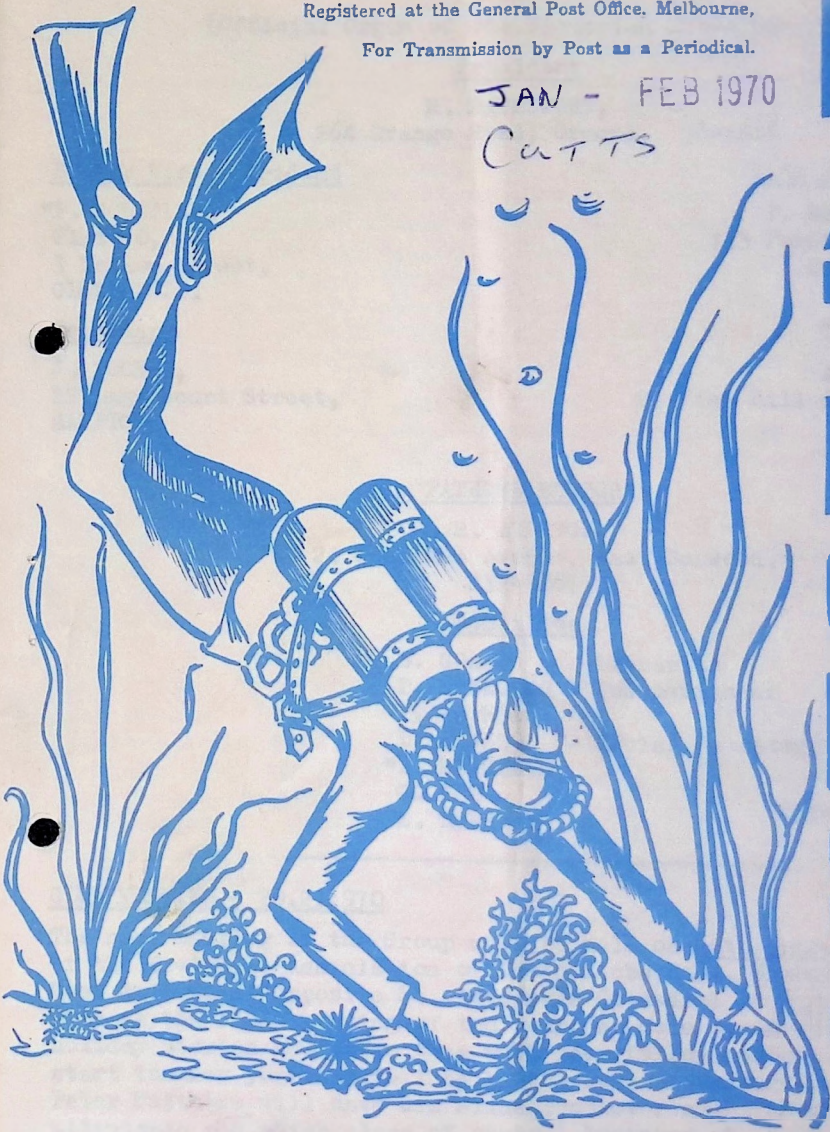


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JAN - FEB 1970  
CUTTS

# FATHOMS



## VICTORIAN SUB-AQUA GROUP

## (Official Organ of the Victorian Sub-Aqua Group)

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CLUB MEETING - 20.2.1970

The next Meeting of the Group will be held on 20th February, 1970 at the Victorian Association of Youth Clubs Hall, Gisborne Street East Melbourne, opposite St. Patrick's Cathedral at 8.00 p.m. sharp. This is the first meeting of the year, so come along with all your holiday stories and share them with your fellow members. Let's start the new year off well by having full attendance at meetings. Peter Matthews will have his slide projector and slides in attendance and after close of general business at 9.00 p.m. will begin screening. So remember, general business at 8.00 p.m. sharp, slides at 9.00 p.m.

THE BENDS

Decompression sickness is the retribution upon those who ignore the tables and is one of the major hazards of diving. Occasionally one hears of people who seem to get away with it, but the natural pattern of this illness is such that, sooner or later, they will have to be taken to a recompression chamber for treatment. The boundary between safety and danger varies considerably between individuals and from one day to another so that it is always foolish to go beyond the well-established safety of the current tables. Even so, misfortunes do occur and the bends may strike one who has obeyed all the rules. "Fathoms", September, 1969 carried a report of a New Zealand diver who obeyed all the rules but still suffered one attack of the bends.

Symptoms of the bends are noticed soon after surfacing, some within 30 minutes, most within three hours of surfacing, though a twelve hour interval or longer is not unknown.

It is by far the most common form of diving sickness encountered these days. The bends are pains in or around a joint or sometimes deeply in a muscle. They are most commonly felt around knee or shoulder joints and can vary in intensity from excruciating pain to transient mild aches. Bends very rarely attack a diver immediately he has finished his dive; a delay of 20 to 60 minutes is the usual average before any pain is felt. There is no possibility of ignoring a severe attack of the bends and the only satisfactory method of gaining reprieve from pain is recompression.

What causes the bends. If a diver descends to 100 feet under the sea he commences breathing air at this very increased pressure. Almost immediately blood with a full quota of dissolved gas in it is pumped from the lungs to the tissues of the body. These various tissues all have different numbers of open capillaries and, therefore, they all saturate with dissolved gas at different rates. Those with a good blood supply saturate rapidly, and those with a poor blood supply saturate slowly. If, after a few minutes at 100 feet, it was possible to examine the gas content of the tissues, of the diver's body, it would be found that such parts as the kidneys, heart and lungs had a very large amount of gas in them, whereas cartilage, tendon and other such tissues had a comparatively small amount of gas. Now, allow the diver to stay at 100 feet for a further hour and imagine re-examining the state of his tissues. All those organs with a good blood supply, the kidney, heart, etc. would have the same dissolved gas content as on the previous analysis performed after only a few minutes, but those

that are poorly supplied with blood would have gained an appreciable amount. Eventually, after many hours of exposure, all tissues would reach a gas content beyond which they would no longer change.

It is now necessary to examine how this acquisition of gas affects the decompression problem. Many years ago it was shown that if animals die as a result of severe attack of decompression sickness then large numbers of bubbles are found in the blood vessels and tissues. Analysis of the gas in these bubbles reveals that it consists almost entirely of nitrogen. It is the inert gas content of the breathing medium that causes nearly all the decompression sickness problems of the diver. If one could dive on oxygen alone, the difficulties of decompression would be very much less. The trouble is that once the oxygen pressure in the breathing medium exceeds 20 atmospheres there is a risk of oxygen poisoning effects occurring especially in a diver doing hard underwater work. Nevertheless, there are considerable decompression advantages for a diver breathing oxygen-rich mixtures whilst at depth.

Once it had been realised that the nitrogen content of the air was the main cause of the bubbles seen during severe attacks of decompression sickness, it became of importance to discover the speed with which nitrogen entered and left the body. This problem was approached in two ways. Firstly, nitrogen gas elimination from the body was measured in the following manner. A man at atmospheric pressure was fitted with an oxygen breathing apparatus. As he breathed pure oxygen from his apparatus his exhaled breath contained nitrogen gas which was being washed out of his body. This nitrogen had been acquired through previous living at one atmosphere pressure in ordinary air containing 79 per cent  $N_2$ , 21 per cent  $O_2$ . Measurements at convenient intervals, were made of the nitrogen content of the exhaled breath. In this way the speed of removal of nitrogen from the body was obtained. Secondly, nitrogen uptake was estimated by actually decompressing men and plotting a curve showing their sensitivity to attacks of bends. This was carried out as follows. For example, a dive duration of 25 minutes was chosen. Divers were then rapidly compressed in air to, say, 80 feet and kept there, working hard, for the agreed period of 25 minutes after which they were rapidly decompressed at 60 feet per minute back to the surface (atmospheric pressure). When this proved to be a perfectly safe procedure for a group of healthy young men, the pressure was raised the next time they tried this 25 minute dive. So they all now performed a dive of 25 minutes at 90 feet with no stops on the way back to atmospheric pressure. Again this proved to be safe. The next dive was 25 minutes at 100 feet which gave marginal trouble in

small percentage of men, i.e. mild transient attacks of the niggles. This was an indication that after 25 minutes at 100 feet most normal men had acquired just sufficient nitrogen to be tolerated on immediate return to atmospheric pressure. Having established this point, another time was chosen, say, 60 minutes. Here it was found that most normal men would tolerate 60 feet before coming near to trouble. Thus, it is now possible to say that 60 minutes at 60 feet also gives just sufficient nitrogen to permit rapid safe return to atmospheric pressure. A curve can be constructed showing the various pressures one can go to safely and how long one can stay there without causing any decompression problem. Thus, there is obtained data showing the connection between the rate of uptake of gas by the body and the decompression performance. All the main facts are now available for calculating a decompression procedure using the limits of performance that have been obtained.

It is at this point that a digression must be made to assess the position regarding the various decompression tables available throughout the world. Suppose a diver wishes to go to 100 feet and stay at this depth for the maximum length of time which just allows him to return to the surface without decompression, he will see the following different international calculations. The Royal Navy's table will allow a 20 minute dive, the United States will allow 25 minutes, and some Italian tables will allow 30 minutes. The diver may then decide to use that routine which allows him to stay 30 minutes and apparently surface in safety. Why not? The answer is twofold. Firstly, it very much depends where the constructor of a decompression schedule sets his safety limits; secondly, what sort of men he has used to obtain his basic data; thirdly, the sort of work they performed whilst at depth; fourthly, the water conditions (temperature, etc.), and, finally, the way the decompression procedure was performed.

It can be seen that the Royal Navy's tables are the most conservative. Even so, a word of warning is necessary. If the diver is in a position to do dives beyond the black line of the table he must expect some risk of mild decompression sickness.

Repetitive dives are a difficult problem. The number of possible combinations available concerning depth and time of the first dive, the time interval on the surface, and the depth and time of the second dive, is enormous. Therefore, unless the diver has a decompression computer, the rules adopted have to be crude and they must err on the safe side. For about 12 hours after his first dive, a man will be losing from his tissues the

dissolved gas he acquired during his exposure to pressure. Consequently, if he wants to dive again within 12 hours of completing his first dive, there is residual gas in his body tissues which will be added to the gas he acquires on his second dive. This means that the second dive must have a decompression which takes this into account.

There are quite complex procedures which may be adopted for this and as a result of the mental work involved it is possible to save decompression time in some instances. If a diver wishes to dive for 20 minutes at 100 feet and one hour later to repeat the dive, then, using the present RN method, the bottom times of the two dives would be added together, and the decompression given to the second dive would be for 40 minutes at 100 feet. Some other procedures are far more complicated than this, but the differences between the more complex error-prone routines and the simple principle of adding the bottom times are really very marginal over most of the usual combinations of pressure and time available to the amateur. Only when carrying out very dissimilar dives with surface intervals over one hour is there a distinct advantage in the more complex procedures.

A copy of the decompression table from the club's hand-book is reproduced on page 8. for members to snip out and keep with their diving gear.

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#### PAST OUTINGS

#### CLUB DINNER, "THE BARREL", 6/12/69

Fifty-six members and friends turned up for the club's premier function of the year and all had an extremely good time. Peter Matthews and Frank Coustley were presented with their Life Membership Certificates and badges and the president, Max Davenport, made a short speech congratulating the two members on their achievements. This looks like being Frank's last dinner with the club for a couple of years as he has been transferred to Queensland with his firm. We hope that Frank has every success in his new appointment and that he never loses sight of the fact that V.S.A.G. is his home club.

Twenty members and friends returned to Bill Gray's place when the Barrel closed and continued the celebrations into the wee small hours. The club takes the opportunity to thank Pat and Bill very much for their hospitality, good food and an abundance of good drink which were made available. It was a pity that the weather was too cool for swimming in Bill's pool.

DECOMPRESSION TABLE

MAX. TIMES ON BOTTOM IN MINS. includes time taken to descend.

	30	40	50	60	70	80	90	100	110	120	130	140	150	160	170	180	190	200	
8																			
9																			
10												5	5	10b	10b	10b	10b	15	
11																			
14																			
15			NO STOPS							5	5	10b	10b	15	15	20b	25b	25b	
17																			
20									5	5	10b	15	20a	25b	30a	35b			
25								5	10b	10b	15	20a	30b	35b					
30							5	10b	15	20a	25a	30b							
35						5	10b	15	20a	25a	30b								
40					5	10b	20a	25a	35a										
45				5	10b	15	25a	30b											
50				5	10b	20a	30b												
55				5	15	25a	35a												
60				10b	20a	30b													
65			5	15	25a	35a													
70			5	15	25a														
75			10b	20a	30a														
80			10b	25a															
85			15	25a															
90		5	15	30a															
95		5	20a	35a															
100		5	20a																
105		5	25a																
110		10a	25a																
115		10a	30a																
120		10a	30a																
130																			
135																			

## KEY FOR STOPS

DECOMPRESSION TIME (Mins.)	Stops (Mins)			
	30'	20'	10'	5'
5	-	-	-	5
10a	-	-	-	10
b	-	5	5	
15	-	5	10	
20a	-	5	15	
b	5	5	10	
25a	-	5	20	
b	5	5	15	
30a	-	5	25	
b	5	5	20	
c	5	10	15	
35a	5	5	25	
b	5	10	20	

Times at Stops include Time of ascent  
 from Bottom or Previous Stop  
 Rate of Ascent - 1 foot per second.

 No  
 Limit

PAST MEETING, 12.12.69

This was the last meeting for 1969 and was a sparse turn up in attendance. The President expressed disappointment that so few could spare time to support the Group. Of a total membership in excess of 40, only 18 arrived to share the supper supplied by members.

Prior to supper a spirited discussion took place on how to make club meetings more interesting. There were complaints from members that club meetings were run on a too rigid style, too much discipline. On the heels of that, another member said the President did not have enough control over meetings. Another said that he wasn't interested in the official running of the club and he wanted more entertainment in the form of slide and movie shows. Another member wanted to know why members who did not attend were absent. As it does not appear to be members' policy to show courtesy to the group by phoning a committee member to apologise for non-attendance, the President could not answer.

A lot of criticism was fired at the club administration, and if those who did the firing were to reflect, they would find that most of it was not justified. However, meetings in 1970 will endeavour to be brighter, more informative with lectures, discussions, slide and movie shows, and the like. In return, the committee would like to see a return of interest from members in the form of better attendance at meetings and diving outings.

The second of these new look meetings will be a movie of Rod Taylor's of the Mt. Gambier Lakes area on 20th March, 1970. Many clubs of S.D.F. are welcome at this screening which will commence after general business at 9 p.m. So, secretaries of B.R.U.D.G., Bass Strait Underwater Explorers and Ringwood, inform your members. This is a terrific movie and well worth seeing. It would be appreciated if secretaries could inform V.S.A.G.'s president of numbers who will attend so that adequate seating can be arranged. For the small price of 25c supper consisting of biscuits and coffee will be served.

PAST OUTINGS - AUSTRALIA DAY WEEKEND, JANUARY 24/26th - PORTLAND.

Six divers turned up at Portland on Friday night, but four in one party missed two in the other party and they didn't meet up again until Sunday morning at Mt. Gambier. The four in party one dived at Portland on the Saturday around the rock filled wharf and caught four very nice fish before moving on to the lakes area.

Party two was already in the area diving in the Blue Lakes. Party one dived in Piccaninny Blue Lake first but found the water stirred up by other divers in the area and visibility was no good



until over the hundred foot mark. They then moved onto One Tree, max. depth 185', and found the water crystal clear, no other divers having been there.

Party one then moved back to Ewens and found Party two ready to move out after having dived in Ewens at six o'clock in the morning. There's keenness for you.

Closer liaison between the two parties prior to leaving Melbourne would have resulted in a much more pleasant time for all concerned and would have really made the weekend.

#### JOINT NEFEAN, FEBRUARY, 8th. 1970

A report on this dive will appear in the March issue of "Fathoms".

#### FUTURE OUTINGS

#### FEBRUARY 21st - CANADIAN BAY - NIGHT DIVE.

Meet at the Morning Pier at 8.00 p.m. and subject to weather conditions a decision will be made on the exact locale of the dive. After the dive a Bar-B-que will be held and it is hoped that the weather will be kind. For final preparations come to the meeting on the 20th February. Divers other than V.S.A.G. are welcome to attend.

#### MARCH 7/9th - LABOUR DAY WEEKEND - WILSON'S PROM.

The club will be camping at Wilson's Promontory during this weekend and it is hoped that the members' small boats will be in attendance as a visit to the Glennies would really make this weekend. Come to the meeting on the 20th and signify your intentions of going.

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FUTURE OUTINGS TO END OF YEAR

	MARCH 22nd	- CAPE WOOLAMAI - Boat ?
EASTER	- " 27th/30th	- BITTANGABEE
	APRIL 12th	- QUEENSCLIFF
	" 26th	- CRAWFISH ROCK - Boat
	MAY 10th	- LOCH ARD - Boat
	" 24th	- POPE'S EYE - Boat
QUEEN'S BIRTHDAY	- JUNE	- CAPE LIPTRAP
	" 21st	- CAPE SCHANK
	JULY 5th	- VICTORIA TOWERS - Boat
	" 19th	- FRANKSTON WRECK - Boat
	AUGUST 2nd	- SNOW TRIP
	" 16th	- FORTSEA
	" 30th	- TO BE DECIDED
	SEPTEMBER 6th	- DIAMOND BAY
	" 20th	- GEELONG PIER
	OCTOBER 4th	- CHANNEL FORT - Boat
	" 18th (W/E trip)	- BLACKWOOD - Gold Dive
	NOVEMBER 1st	- PHILLIP ISLAND
	" 15th	- KELP FARM - Boat
	" 29th	- RYE
	DECEMBER 12th	- DINNER

QUARTERMASTER'S REPORT

The Club owns diving gear available for use by members and this includes everything except wet suits. Set out below is a list of club gear which, at the moment, is being held by me -  
phone: 232-5358 :

Cont'd. 12.

one 250 cubic ft. storage cylinder and reducer  
 125 ft. hookah hose and two demand valves  
 one echo sounder  
 one boat ladder  
 one first-aid kit  
 one long carriage typewriter (editor of newsletter  
 holds this)  
 ancillary ropes, buoys, shot lines and weight,  
 diving flags, complete in wicker basket.  
 one loudhailer  
 one 72 cubic ft. S.C.U.B.A. soon to be complete  
 5 pairs flippers, 5 masks and five snorkels.

All this gear is available for use by members and a small rental is charged. The gear that is used on official group outings is available free, i.e. echo sounder, boat ladder, first-aid kit, etc.

Couple all this equipment with the group's extensive library of extremely interesting books on all aspects of diving, plus our holdings of club badges, pocket badges, and flags, and it is evident that our assets are great.

P. REYNOLDS,  
 Quartermaster.

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#### GROUP LIBRARY

Books may be borrowed from the Group Library for a period of one month. Books outstanding after this will be subject to a fine prescribed by the committee.

1. SHIPWRECKS, by Margaret E. McKenzie.
2. UNDERWATER HUNTING, by Dr. Gilbert Doukan.
3. BETWEEN THE TIDES, by Phillip Spreet.
4. MODERN SPEAR FISHING, by Van Ivanovic.
5. MAN AND THE UNDERWATER WORLD, by Pierre De Latil and  
Jean Rivoire
6. UNDERWATER SPORT, by Barry J. Kinnins.
7. LADY WITH THE SPEAR, by Eugenie Clark.
8. SHALLOW WATER DIVING AND SPEAR FISHING, by Hilbert Schenck  
and Henry Kendall

9. UNITED STATES DIVING MANUAL.
  10. BRITISH SUB AQUA DIVING MANUAL.
  11. CAPT. COSTEAU'S UNDERWATER TREASURY, by Jacques Yves Costeau and James Dugan.
  12. SKIN DIVING IN AUSTRALIA, by Edward Du Gros.
  13. DEEP DIVING.
  14. GREAT TRUE STORIES OF THE SEA, by Enund V. Corbett.
  15. THE FROGMAN, by Ivaldron and Gleeson.
  16. THE KON-TIKI EXPEDITION, by Thor Heyerdah.
  17. UNDERWATER HANDBOOK.
  18. UNDERWATER PHOTOGRAPHY AND TELEVISION, by E.R. Cross.
  19. AUSTRALIAN SEASHORES, by Dakin.
  20. SHARKS AND OTHER PREDATORY FISH OF AUSTRALIA, by Peter Goadby.
  21. MARINE SALVAGE OPERATIONS, by Brady.
  22. MARINE MOLLUSCS OF VICTORIA, by McPherson and Gabriel.
  23. THE SEA AROUND US, by Rachel Carson.
  24. HANDBOOK FOR SKINDIVERS, by Ben Cropp.
  25. EXPEDITION INTO THE UNKNOWN, by Hans Hass.
  26. THE UNDERSEA CHALLENGE.
  27. THE LIVING SEA, by Costeau.
- Periodicals: SKINDIVER MAGAZINE, TRITON AND DIVE.

I have these books at every meeting of the Group, so don't be shy, come up, borrow a book and further your knowledge on the underwater world.

B. GRAY - Librarian.

REPORT on Port Phillip Bay artificial "Reef" project and  
RECOMMENDATIONS for new site for further "Reef" projects.

Recent (23/11/69) and past underwater surveys of the artificial "Reef" in Port Phillip Bay have forcefully indicated to observe the unsuitability of the area for such a project. The area is totally unsuitable for the following reasons:

- (1) Depth of mud, (av. 6 feet) into which most of the "reef" material have disappeared.
- (2) Extreme turbidity of the water and rapid rate of deposition of sediment which has smothered many of the invertebrate animals of the original colonizing community.

Our first survey of the "Reef", 6 months after it was laid down, showed that those pipes which were fortunate to land on others already under the ooze, were almost covered with various invertebrate species, internally and externally. Colonization was rapid and

many families were represented.

Now however, the total number of species has dwindled appreciably. The animals now must abundant being oysters (*Ostrea angasi*), mussels (*Mytilus planulatus*) and a few species of tunicates. To most of these animals and to exposed portions of the concrete pipes is attached a small bryozoan (probably *Matea tortuosa*) which now appears to be the dominant animal followed by the oyster and mussel and little else. It is my considered opinion that the constantly settling silt which keeps the water in the area in an extremely turbid condition, has smothered many of the original inhabitants of the "Reef"; only those species which can tolerate such conditions having survived. I consider that it is only a matter of time before those pipes which at present are above or partly above the surface of the mud will be covered by the mud.

That this site was chosen for the "Reef" is most unfortunate as its full potential as a means of raising the populations of marine animals, particularly the fish population, will never be realised. Nevertheless, on weekend days of good weather conditions, large numbers of amateur fishermen are attracted to the area. This is an indication that it still has some potential as a fish "haven". In view of the above, I suggest that any further material dumped on the present site at any time in the future will be largely wasted. In time, completely wasted. Therefore, a new site in clean water with a firm substrate and a minimum of sediment "fallout" is necessary for any new artificial "Reef" projects. Such projects must continue and increase in numbers. There are many divers and amateur fishermen who are keen to assist with the building of more such "Reefs". On a past exploratory dive in the vicinity of the "Reef", the mud depth was measured at various stations from the mud basin eastwards toward shore (north of the present "Reef" site) and it was found that in the area covered with 9 fathoms of water, the mud depth was from 9 to 12 inches with a firm soil below. Water clarity was such that a species of green algae was growing in abundance. An area such as this would, in my opinion, be ideal for the siting of new "Reefs". Furthermore, being closer to shore, it would be safer for fishermen with small boats. It would be less likely to be a hazard to shipping straying off course. Every effort should be made to have new sites allotted for "Reef" building and every effort made to have them in areas of clean water on a firm sea-bottom so that, as projects of major importance, their full potential can be realised.

As a tool for the study of invertebrate colonization and for the study of fish populations, artificial "Reefs" could hardly be bettered. On the present "Reef" site, fish population studies underwater, are possible.

P.G. HOLLIS (President, U.E.C. of Vic.)