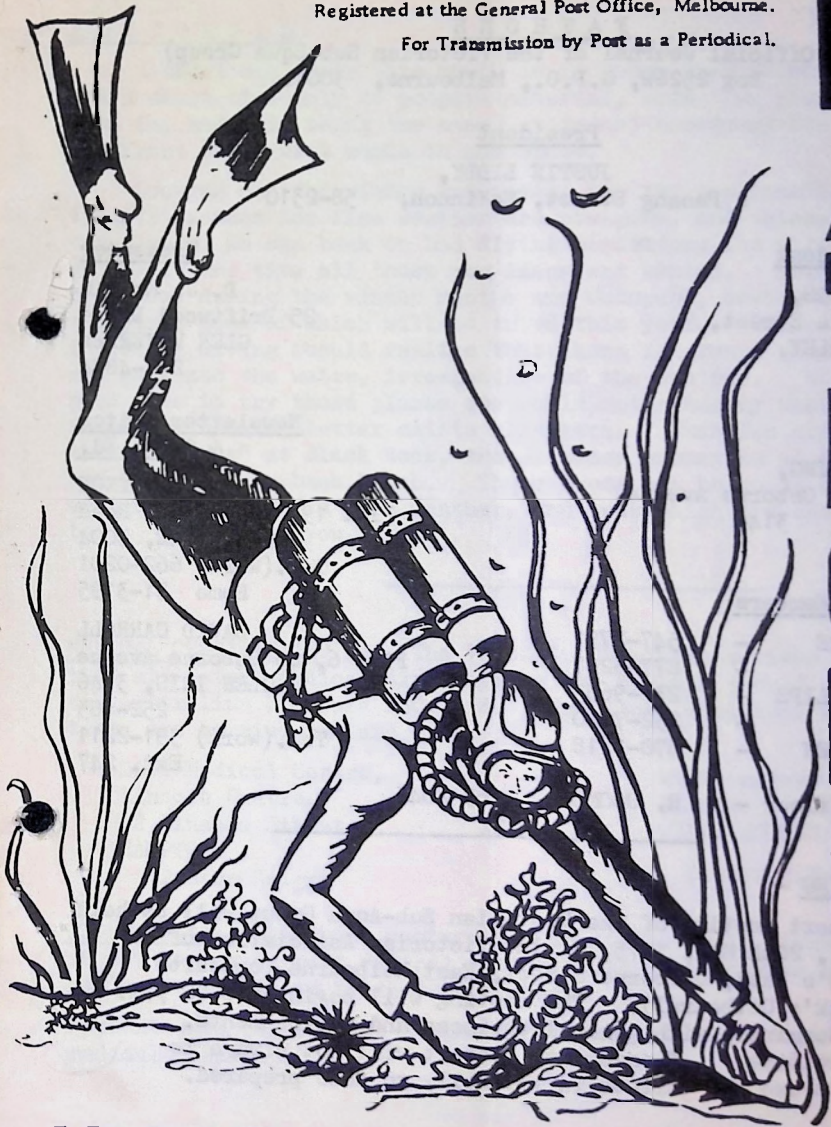


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FATHOMS



VICTORIAN SUB-AQUA GROUP

F A T H O M S

(Official Journal of the Victorian Sub-Squa Group)

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CLUB MEETING -

The next meeting of the Victorian Sub-Aqua Group will be held on TUESDAY, 20th MAY, 1975, at the Victorian Association of Youth Club's Hall, Gisborne Street, East Melbourne (opposite St. Patrick's Cathedral). The meeting will begin at 8.00 p.m. and will terminate with general business and refreshments. Visitors welcome. Please note that it will not always be possible to use the toilets in the hall, so come prepared.

EDITORIAL

A short one again this month as it seems that although we've had a short time only to prepare material, this time plenty has come in, and this being the case, it is not necessary for me to fill the front pages with words to add space.

Looking out the window and seeing the sky one realizes that the 1974/75 excuses for fine weather are now gone, and unless we are very lucky, we can bank on bad diving conditions for a few months, so NOW is the time all those new ideas war wanted. Possible outlets of energy during the winter months are Octopush, caving and tube tripping, some of which will be tried this year. Others who will insist on diving should realize that there is always somewhere you can get into the water, irrespective of the weather. Winter is a good time to try those places one would not normally waste time on in summer because better exists elsewhere. Examples are, around the "Cerberus" at Black Rock, the J. class submarine at Sandringham and Williamstown back beach. These spots can be quite all right in winter as well as in good weather, and ones which are easy to get to. It's up to you, Ed.

MEDICAL CERTIFICATES - The V.S.A.G. Committee advises all members that all future medical examinations for members should conform to the Australian Standard ASC.Z 18. Two known locations where these tests are carried out are -

Dive Medical Centre,
Linacre Centre,
12 Linacre Street,
HAMPTON.

AND

Williamstown Clinic,
Electra Street,
WILLIAMSTOWN

Doctor Knight

Doctor Silver

Please note: All those members listed in the April issue of Fathoms as not having current medical certificates must produce a current medical certificate by the end of May.

Appointments can be made at the abovementioned places for a thorough medical check up.

D I V E C A L E N D A R

- MAY 4th - Portsea Hole.
Dive Captain, B. Truscott (783-9095)
Meet Sorrento Boar Ramp, 8.00 a.m.
- MAY 11th - Spray Point Road, Back Beach (East of Koonya
Beach near Sorrento). Dive Captain, H. Allen.
Meet 9.00 a.m.
- MAY 17/18th - CDAА Category 3 Testing, Mt. Gambier.
Contact H. Allen, 870-1218.
- MAY 20th - V.S.A.G. General Meeting.
- MAY 23rd - Fancy Dress Party at J. Liddy's.
Come as a "THING", not as a "Person".
- MAY 25th - Pinnacles. Meet San Remo Fishermen's Co-op.
8.30 a.m. Dive Captain, H. Allen, 870-1218.
- JUNE 14/15/16th - Eden Safari. Dive captain, Dave Carroll.
Stay at Council Caravan Park, Eden.
Contact D. Carroll, 252883 (Priv.) or
391-2211, Ext. 247.
- JUNE 8th - Mornington Dive (Novices and all).
Very mysterious, safe and hard in some ways.
\$1 per head, chance of great financial gain.
10 a.m. Mornington Pier.
(Social) Organizer, Dave Moore, 547-2791

FLINDERS DIVE - SUNDAY, 13 APRIL

The sun was shining, the sea looked reasonably placid, and we started to gather at Flinders pier car park at 8.50 a.m. We started to change and put the boats in and set off just after 10.00 a.m. We headed out past the pier which was alive with diving schools and divers and into long swells coming in with the easterly wind. At this stage we had eleven divers having left four of our brethren back on the beach for a varied assortment of reasons, the most notable being Pete's elusive wet suit.

Back to the plot. We motored along the coast, but to our growing dismay, found that the swells and the surf grew heavier as we went on.

In the spots where we have dived before with some protection offered by outlying reefs, we found that the easterly wind was just pounding the waves through the gaps and then some halfway up the cliff faces. Not even the gallant Bazza felt like venturing in. So we retraced our passage looking for some less hairy, more sheltered water. We anchored in the lee of a bluff and Rob and I went down for a look. Well, you know Rob, anything to get off a rocking boat.

Once on the bottom, we found that we had about nine foot visibility in 50 feet depth. The surge was quite strong and the bottom wasn't that interesting, some weed covered rocks, but no ledges. We headed in towards the cliff but no great change. We returned to the anchor line and ascended slowly through the milky water.

Back on the boats we headed out to sea where we dropped Trevor's anchor attached to Dave Moore and Tony Sunshall. Once again not much to report. We were about 200 metres off shore in 80 feet of water, Dave told us, and that there was flat rock, no weed, no crayfish, nothing else, in fact, just flat rock, so on the move again. About this time Rob was calling for his friend Ralph, Jeff Oak was looking for someone called Herb and John and Carey were beginning to change colour. However, undaunted we plugged on.

We dropped anchor for the last time about 300 metres off shore and closer to Flinders. Sending Frank Derksen and Jeff Barker down the line we waited their return. A bit flat but worth a visit, they said, so all of us still able to move donned our gear and over we went. Down into 80 feet of rather chilly Bass Strait water. Visibility a little better than closer in, some 15-20 feet flat rocky bottom, sparse weed growth, with small hummocks of rock dotted here and there. Not much fish life. What fish there were, were all huddled together in a small hole on the protected side of the biggest rock down there, not a feeler in sight. So up we came. We headed back across a flattening sea but we could still see white water erupting onto the Seal Island rocks across on our starboard quarter.

Alongside Flinders pier we moved very slowly noting that there were still many divers undergoing training until we were back on the beach whereupon Rob and Geoff leapt overboard and embraced the sand thankfully. After we pulled the boats out, I took Diane on a tour of the pier accompanying Trevor who flashed and twisted beneath us like a seal with a tank on its back. Then back to the beach for lunch and a reunion with some of our social members as Bazza very nicely put it. The sun was still shining and we had had a good day even

though we had to search around for a spot to get into the water, we had finally made it. Our thanks once again to the boat owners without whose efforts we, too, would have been on or under the pier.

Those present were - Justin, Katriona, Max, Peter Oakley, Dave (C), Dave and Pat, Tony, Bazza, Trevor, John and Carey, Frank and his new car, Rob, Jeff Barker, Geoff Oak and Diane and myself.

BRIAN LYNCH.

DIVER OF THE YEAR AWARD

Here we are almost halfway through the year with the points score towards the "Diver of the Year" trophy. These are points scored up to the first of March and so those of you who have dived after that time have more points to add on to these marks. Remember, that the only way a record can be kept is by you signing in the attendance book at the monthly meeting, or if you cannot attend, make sure that someone signs you in. If you feel that your score is not correct, contact Allan Cutts so that if points are being missed, this can be rectified before we head into the final straight later this year.

At the moment the head is shared by the two finalists of last year followed closely by Dave Moore and Bazza. It is good to see new names appearing in the front runners and watch Frank Derksen, who only started gathering points in December, but is way up there in seventh place. Since the points system was amended and more points given to dive attendances, we can see that we do have a good strong nucleus of practical divers, which is reflected in our good turnouts so far this year.

Remember, too, that points are given for magazine articles and for bringing along new members, so let's be hearing from you.

Diver of the Year Award -

1.	J. GOULDING and B. LYNCH	-	372
3.	D. MOORE	-	342
4.	B. TRUSCOTT	-	312
5.	D. CARROLL	-	289
6.	M. SYNON	-	270
7.	F. DERKSEN	-	210
8.	T. COWLEY	-	204
9.	A. CUTTS	-	197
10.	H. ALLEN	-	190
11.	J. LIDDY	-	165
12.	P. REYNOLDS	-	152
13.	P. OAKLEY	-	130
14.	N. LEES	-	97
15.	C. RAMAGE	-	95
16.	J. MARSHALL	-	93
17.	R. ADAMSON	-	90
18.	R. SCOTT	-	79
19.	D.J. McBEAN	-	74
20.	T. SMITH	-	61
21.	P. SIER	-	45
22.	B. JANSSEN	-	44
23.	R. COOMBER	-	34
24.	B. HOOPER	-	26
25.	A. NEUMANN	-	24
26.	I. COCKERELL	-	
	W. GRAY	-	
	M. PHILLIPS	-	22
29.	R. PARKER	-	
	R. COADE	-	
	P. SMITH	-	
	P. RAINBOW	-	
	B. DEGENHARDT	-	
	K. STEWART	-	12
35.	G. RYAN	-	10
36.	M. RICHARDSON	-	3
37.	P. PARTRIDGE	-	2

DIVING AT THE POOR KNIGHTS ISLANDS

Over the past couple of years, the two or three New Zealand divers I've met, have all expounded great stories about the waters around the Poor Knights Islands off New Zealand's north-east coast. So in making plans and bookings for my recent trip, I made sure to have a couple of spare days to do some KIWI diving.

After having battled snowstorms, avalanches, landslides, raging flooded rivers and some of the most beautiful scenes imaginable, Maree and I found our way to a peaceful little seaside village called "Tutukaka" on the north-east coast on the North Island. Here we had arranged to meet members of the North Shore Neptunes Club for a charter-boat dive out to the Islands.

The Poor Knights Islands are a group of rock islands about 14 miles out from the coast. The boat trip took about two hours to get out and find a sheltered spot to anchor. Then it was a case of kit up and dive. I was buddied with the dive captain, who decided that we should be the first to dive, mainly to check the shark activity. Well, as my fearless buddy loaded his triple rubber spear gun, rubbed on his shark repellent and climbed into his armour plated wet suit, which bristled with long poison tipped spikes, I was beginning to wish I didn't have orange flippers and Fenzy and wished I had my hook.

Anyway, to get on with the story, the dive captain handed me a Hawaiian sling and suggested I keep close to the rock wall and close to him. No worries, I thought So, in we went and immediately peered down through about 80 feet to the bottom. We snorkelled to the rock wall and then descended about 50 feet and headed west to a corner of the island where the "Munchies" were. Well, this day they must have been having lunch elsewhere, because there was only one big fellow which was identified as a Bronze Whaler. We watched him swim effortlessly away and so we swam off to enjoy our dive. Visibility was good; about 80 feet., and the water was very blue. Apparently the vis. at the Knights gets up over 100 feet on a good day, but this wasn't bad for a start. We swam around the rock face and I was amazed at the vast quantities of beautifully coloured fish. The water was teeming with kaleidoscopic colour. Plant growth was not as magnificent as the fish life, but was very plentiful.

Along the wall where we were diving, a huge arch had formed which allowed sunlight to pour through like some giant beam. Here the visibility was even better, however, as our time was getting short we decided to surface. It was at this moment that a 4 foot Kingfish

swam past my buddy and was neatly shot. With blood trailing from its wound the fish went into a desperate frenzy which I was sure would alert our munchy friend, but he still declined to join us. (Probably scared of us Victorian Divers.)

Aboard boat our skipper provided hot soup and this, together with some sandwiches, provided a comforting respite. The dive plan was to make two dives for the day, so after about 3 hours rest and careful checking of dive tables, it was back in again. By this time the weather had blown up and the visibility was only half that of the first dive. Still it was good and the new location provided more colourful plant life and sponges.

With the wind now blowing at 40-59 knots, we made a very slow and rough crossing back to port and it was the bad weather which made me decide to give the Sunday Dive a miss and do some sightseeing.

I must say that the Poor Knights Islands offer exciting diving which should delight any enthusiast whether he be photographing, hunting or just poking about.

My thanks to Tony Snushall; an ex member of Rotorua Underwater Club, and the North Shore Neptunes Club, for helping to make this trip possible.

JOHN GOULDING.

SHIP MUSEUM PLAN

A new move for a floating maritime museum at Williamstown, involving the historic corvette HMAS Castlemaine, is being planned. The Castlemaine, which was built at Williamstown, could be berthed at Williamstown, along with other small craft.

The Maritime Trust of Australia is discussing the project with the Harbor Trust, with a view to using the west side of Gem Pier, a small wharf off Nelson Place. Williamstown Council was told of the proposal on Monday. The comment was made that the Maritime Trust was the organisation behind a proposal to raise the iron warship Cerberus from the Port Phillip beachfront where she rests, but that this project was not going too well. It was also said that Williamstown would have a maritime museum "sooner or later."

The council will invite the Maritime Trust to discuss the plan with it.

BOB SCOTT

FLOTSAM & JETSAM

Due to an underhanded conspiracy by the twelve faceless men who call themselves the VSAG committee, all articles for the May issue of "Fathoms" have to be in earlier than normal. So this gives us one club's outing to recall in the inspired, or is it insipid, words of this column. I refer, of course, to the recent Flinders Dive, ably led by Brian Lynch.

This outing went off so calmly that there is really little we can comment on. So with a lack of real club activity, we must do a little roving reporting.

We are glad to report that the Training Sessions are coming along rather well. We were most fortunate in securing the Clayton baths at a moderate cost to conduct the course and it is reported by the Training Officer that all pupils are progressing well and interest is keen.

Did you hear the one about the diver in the U.S. who beat a drunk driving charge by explaining to the Judge that he had learnt to control his senses and reflexes whilst suffering from nitrogen narcosis and that being drunk was no hassle for him..... The judge is now advocating that drunk diving is a remedy for drunk driving.

Two future dives which have been selected for May and June are The Pinnacles and Eden. The Pinnacles offers one of the most interesting dives visited by our club. On past experience we have found excellent visibility, plenty of fish to photograph and watch, and magnificent growth and colour. Eden, on the other hand is relatively untried by most of us, yet this area offers great diving in good weather and the historical significance of Eden makes it extremely interesting even if you never get in the water.

It is rumored that our old friend Tony Tipping will soon be home and is looking forward to getting into some good diving. Tony has done a fair bit of snorkelling whilst overseas and this, together with odd attempts at mounting climbing, bush walking and probably running after maidens, has made him a pretty fit fellow.

A recent article in "The Sun" newspaper reports an interesting story about the wreck of the sailing ship "Schonberg". After the Schonberg hit a reef near Peterborough in 1855, part of wreck drifted across the Tasman Sea to New Zealand. The wreckage

Flotsam & Jetsam (Cont'd.)

finally was washed up into the Tauperikaka Creek in the South Island. For years nobody knew where the wreckage came from and rumors of a "Spanish Galleon", Pirate Ship and others abounded. In the 1920's it was finally identified as being part of the "Schomberg". It is rather strange or maybe just coincidental that this story should be reported at this time. Isn't it true that Johnny Goulding was in New Zealand recently and did take his diving gear. The question should be asked of our mate as to where he really did get that bronze plate with the ancient carving. Perhaps there will be another Baraboogie Bell episode.

Well, that's enough for this month. Good Diving folks,

Y. REEDIT.

MEDICALLY SPEAKING

-

NITROGEN NARCOSIS

Nitrogen at high pressures produces a narcotic effect similar to drugs such as Nitrous Oxide (Laughing Gas), alcohol or ether. This effect is probably induced in the same way, i.e. interference with the metabolism of the brain cells. Subjective effects on mental performance have been reported from depths as little as 65ft. and unconsciousness occurs somewhere between 500 - 1200 ft.

In practice the first symptoms are likely to appear at 130-150ft. where the diver becomes jovial and carefree. At 150-200 ft. drowsiness occurs and 200-250ft the diver becomes as clumsy as to be useless in performing any work.

Nitrogen narcosis is easily reversed just by ascending to a higher level and the symptoms disappear almost immediately. Because of the similarity to alcohol the term "raptures of the deep" was proposed and like alcohol the effects on anyone individual will differ. Some experienced divers can handle narcosis, realising that their performance is decreased and be sensible about it, but there will always be the equivalent to the "two pot screamer" who will experience narcosis at a relatively shallow depth and do something stupid. Therefore it is better for an inexperienced diver to ascend quickly until the symptoms disappear. Even the very experienced diver must be fully aware that even though he thinks he can handle the narks, he's just as bad as a drunk who thinks he can handle a car.

CAREY RAMAGE

W A N T E D

8 or 10 KEEN DIVERS TO GO TO THE

OUTER BARRIER REEF

GLADSTONE, QUEENSLAND

FOR 7 - 10 D A Y S

IN

SEPTEMBER or OCTOMER 1975

Party will leave Gladstone aboard Charter Boat and will stay on boat with full board for the duration. Each person will bring their own diving gear, including tanks and compressor is available on board.

Further details will be announced in June, 1975.

Approx. costs are \$25.00 per head per day.

Return Economy Air Fare to Gladstone - \$191.60

(All costs are to be confirmed at a later date.)

Names are to be given to John Goulding before end of June.

THIS WILL BE A GREAT DIVE TRIP, SO GIVE IT A GOOD THOUGHT.

J. GOULDING

Phone: 480-1411 Bus.
25-2883 Priv.

N A U G H T YN I N E T I E S

- JUNE 20th 1975 -

A N N U A L C L U B D I N N E R

675 GLENFERRIE ROAD,

HAWTHORN

(Near Station)

6.30 p.m.	Start
7.00 p.m.	Dinner
8.30 p.m.	Show
10.30 p.m.	Dancing
11.30 p.m.	All Out
11.31 p.m.	???

B.Y.O.

\$9.00 a head - Payable no later than next meeting -
(MAY)

Tickets,
Reservations, or
Just a Chat, from

DAVE MOORE, 547-2791

BEND OR DECOM SICKNESS

The following is not intended as instructions for treatment but an effort to clarify some data about which little, if any, information was made available, for complete info consult the U.S. Navy Diving Manual, 1958.

The first work in caissons under increased air pressure probably occurred sometime about 1840, perhaps slightly earlier. By 1841 the first case of decompression sickness (in two men who were locked out of a caisson together), had been reported in France. Treatment considered of rubbing the affected limbs with alcohol and both workers returned to work the following day. It was not until 1854 that the first regulations governing working times and decompression times were initiated. By 1873 a recompression chamber had been built to treat victims of decompression sickness. Treatment consisted of raising the chamber pressure until equal to the pressure the patient had been subjected to that had caused symptoms to develop. When the symptoms were relieved the pressure was slowly reduced. The decompression from the pressure of relief often lasted for several hours.

As early as 1906 it was found that recompression followed by slow decompression relieved as high as 90% of pain symptoms in decompression sickness patients. Of 3,692 cases of decompression sickness occurring during the construction of a river tunnel, 3,278 cases involved pain without other complicating symptoms.

The first treatment table for D.C. sickness was apparently developed by the British. The decompression sickness patient was placed in the chamber and pressure applied to point of relief of symptoms plus 10 pounds. This pressure was maintained for 30 minutes. Decompression was then at a very slow but steady rate rather than by stages. This table is not practical for use other than in a chamber due to the difficulty in maintaining the slow but critical rate of ascent rather than to the length of time involved.

This and another very similar table were used almost universally for treating decom sickness until a more practical table was developed by the U.S. Navy about 1940. This later table, used until about 1955, called for recompression to point of relief plus 15 pounds pressure. The patient was maintained at this pressure for 30 minutes, then ascent was made at a rate of 25 feet per minute to the first stop.

B.G. Assuming the patient was relieved of symptoms at a pressure of 30 p.s.i. (66 feet). Patient would be taken to a depth of 100 feet,

and held at this pressure for 30 minutes. Then, at a rate of 25 feet per minute, the pressure would be reduced until equal to 40 feet (17.8 p.s.i.) where the patient would be held for 14 minutes, then to 30 feet for 42 min., 20 feet for 52 min., and then to 10 feet for 68 min. A total of $3\frac{1}{2}$ hrs. for treatment, including 4 min. for descent to 100 feet pressure.

This is the shortest air treatment and probably minor symptoms involving pain only would respond to this minimal treatment.

The other extreme occurs when symptoms recur in a patient during treatment. The patient is then recompressed to the point of relief and held 30 min. He is then decompressed to 30 feet (13.4 p.s.i.). This pressure is maintained from 12 to 24 hours. This became known as "the overnight soak" and was as near a guarantee of sure cure as there could be, short of using oxygen.

Using oxygen - air treatment, referring back to the previous example again assume pain symptoms were relieved at a depth of 66 feet. Patient would be held for 30 min. at 100 feet, then at a rate of 25 feet per min. Rise to 80 feet for 12 min. on air, then to 60 feet for 30 min. on oxygen. Then to 50 feet for 30 min. on oxygen, 40 feet for 30 min. on oxygen, 30 feet for 5 min. on oxygen, 20 feet for 5 min. on oxygen, 10 feet for 5 min on oxygen. Total time being reduced to 2 hrs. 17 min. instead of 3 hrs. 30 min. as with only air. But need 7 stops against 4 stops with air.

Tables are drawn up for these treatments similar to those used when diving. The treatment table in general use today was first used in the field about 1949-1950.

The term "Bends" must be used with caution since bends refer to pain symptoms only while "Decompression Sickness" is used for more serious symptoms than pain, e.g. unconsciousness, convulsions, weakness or inability to arms or legs, air embolism, any visual disturbances, dizziness, loss of speech or hearing, severe shortness of breath or chokes and bends occurring while still under pressure.

The term "Bends" was first used during the construction of caissons for the footings of the Brooklyn Bridge when workers, afflicted with decompression sickness, walked in a stooped position to ease the pain. Their posture was similar to that of fashionable ladies of the time who were so bound up with corsets and such that they walked in a bent or stooped position; "Grecian Bends" of the fashion ads. of the day. This was later shortened to "Bends" and was adopted by divers, in error, in modern diving for all symptoms of decompression sickness.

CAN A DIVER BE TREATED FOR DECOM. SICKNESS IN THE WATER?

There is considerable pro and con about this. Some opinions are that the diver should be taken to a chamber no matter how far or how difficult it may be to reach one. Other authorities feel it would be advisable to put the diver back in the water for the required treatment. Obviously a diver, far removed from a chamber should take every precaution to prevent decom sickness, as treatment in the water is not easy. As previously shown, the recommended minimum treatment time is 2 hrs. 17 min. when using air and oxygen if available, and if the patient can be kept warm and protected from the elements, treatment is possible in the water for the short period. However, if complications developed or if symptoms were of a serious type recommended treatment time would be beyond the normal capabilities of divers.

A method intended as first aid only is the "tilt table method" and is to be used, primarily, until the patient can reach a chamber.

In the tilt table technique the decon. or air embolism, patient is placed on a suitable wide board in a head down position. Since the brain receives more blood with the head down the small blood vessels dilate and are thus better able to push the air bubbles along which may eventually allow the bubbles to split up until they are small enough to be dissolved in the blood.

Fluid injection is another technique. As a result of pressure and decompression and resultant loss of plasma, the "red cells" in the blood tended to pack together and the blood stream becomes sluggish. It is unable to carry off the nitrogen bubbles which apparently concentrate in fatty tissues. Intravenous infusion of readily available plasma substitutes restores the circulation.

DAVID MOORE

WHY DON'T MAMMALS GET THE BENDS?

The International Oceanographic Foundation Publication, "Sea Secrets" has the following answer to this question.

"The diaphragm of the porpoise is set at an oblique angle to the length of the body. Under pressure the diaphragm is thus able to squeeze against the respiratory portion of the lungs, collapsing them and pushing air out of the alveoli and into the inelastic bronchial tree. At this location no significant gas transfer occurs, so the animals suffer no extra hazard by descending to greater depths."

When we see a whale or dolphin we see them on the surface for only a small percentage of the time. In fact only when they make a single exhalation and inhalation. This leads to the assumption that these animals are continuously subjected to pressure. However, they do not spend prolonged, repeated dives at great depths. Probably most of their time is at depths of less than 40 feet with occasional, infrequent, deeper dives made for food.

A diving mammal, such as whales, dolphins, and porpoise, are comparable to breath-hold divers; i.e., they must breathe only on the surface at atmospheric pressure. Then, when they dive, hold their breath until they again reach the surface. While it is true that gas goes into solution when breath-hold divers are at depth, the period at depth is not prolonged. Hence there is not the fairly rapid accumulation of excess gases occurring as in scuba and helmet diving. And, in dolphins and whales, according to SEA SECRETS' explanation relatively little excess gas is absorbed during the dive because of the gas being compressed into the inelastic bronchial tree.

DAVID MOORE

WHO'S AFRAID OF THE BIG BAD SHARK

There has always been a great fear of sharks among divers (not to exclude, of course, those courageous V.S.A.G. members),.... but is it all necessary? In my opinion, Yes. Basically there are two categories of sharks - those that are harmless and those that are referred to as man-eaters (or woman-eaters, or are there chauvinistic-type sharks, too).

Who's Afraid of the Big Bad Shark? (Cont'd.)

Harmless sharks could be sub-divided into those that are completely harmless (such as the Port Jackson) and those that are capable of inflicting a wound if provoked (such as the wobbegong or carpet shark).

Of the 100 species of sharks in Australian waters only 7 are said to be capable of seriously mauling or killing a person. They are the Whaler, Tiger, Blue Pointer, White Pointer, Grey Nurse, Great Blue shark and the Hammer Head, of these the Whaler and Tiger could be responsible for most shark attacks as these two regularly inhabit estuaries and foreshores where the attacks occur.

If a shark is seen most likely it will ignore you completely and if it does approach you, it will be through curiosity, certainly not through aggression. In a shark's eye (unless we are mistaken for a Seal appetiser), we are not a very tasty looking morsel. It takes a great deal of blood to attract a shark, but water is a good conductor of sound and the sharks high sense of hearing will easily detect a struggling fish. Therefore, the diver must remain calm and still, so as the shark does not mistake him for a wounded fish, this applies especially in water where visibility is poor.

The two most important traits to remember in sharks, is cowardness and unpredictability, the best offence to an aggressive shark is to stand up to it or even advance towards it, a sudden movement will often scare them away. Never turn and swim from a shark, but then again, never become too confident and if you see a shark, always keep an eye on them, and do not surface. Sit on the bottom.

One consoling fact, is that there has been no recorded shark attack in Australia on a diver wearing scuba gear,

so happy diving,

CAREY RAMAGE

THE DIVER STILL HAS HIS LIMITS by B. Fowler and S.A. Shepherd.

(Taken from Australian Fisheries, Nov. 1974).

In spite of modern improvements in equipment there are still factors which limit a diver's ability to do useful work underwater and may even endanger life. This applies whether the diving done

is for science or salvage or to gather shellfish.

As exploitation of the sea increases divers are required to carry out more complex tasks and spend longer hours in deeper water.

Recent research findings by psychologists help the professional diver to understand his limitations and enable him to plan his underwater work more efficiently and safely. The findings show that complicated interactions between a number of elements finally determine a diver's performance underwater.

These elements include cold, weightlessness, restriction of movement and vision, carbon dioxide build-up and nitrogen narcosis or 'raptures of the deep'. They are summarised in Figure 1 and discussed in this article.

Nitrogen narcosis: Although the use of helium-oxygen mixtures eliminates nitrogen narcosis the average professional diver still uses air and must contend with this problem.

It is now widely recognised that exposure to raised air pressure leads to impairment of mental reasoning and physical co-ordination, lightheadedness, gaiety and eventual unconsciousness at depths of 90 metres or more. A diver's mental functioning is affected before his physical co-ordination. This is illustrated in a study by Kiessling and Maag (1962), who tested subjects in a pressure chamber at a pressure equal to a depth of 30m. They found losses of 37.5 per cent in reaction time and 7.9 per cent in manual dexterity. Note that these losses occurred at a depth of only 30m. where some individuals may be severely affected.

The steep decline in performance with increasing pressure that occurs with narcosis is illustrated in a study by Fowler and Ackles (1972), who used mental arithmetic tests to simulated depths of 90m (Figure 2). In this same study the subjects, who were highly experienced Canadian Forces divers, were able to subjectively estimate their degree of narcosis quite accurately, and reported that they realised their work capabilities were affected.

Contrary to the popular belief that narcosis always causes unjustified self-confidence this finding suggests that an experienced diver can learn to judge his safe working limits while narcotised.

Other recent studies have also demonstrated that narcosis affects memory. Fowler (1973) found that after surfacing the diver may not be able to remember events that occurred underwater, while Fowler and Ackles (1974) showed that a 'narcotic' diver may not be able to recall information given to him before the dive.

Some drugs for example, methedrine, leptazol, scopolomine, some antihistamines and probably many others) increase the severity of narcosis (Bennett, 1962). It is also widely believed although it has not been proved, that alcohol and fatigue enhance the symptoms of narcosis. For further information on this see Bennett (1969) listed in the reference material attached.

Carbon Dioxide: Carbon dioxide (CO₂) build-up in the body may lead to a deterioration in performance. This build-up can be caused by increased breathing resistance due either to poor equipment or hard work or both. Excessive dead space in the breathing equipment or mask also contributes to this problem. Hesser and others (1971) tested divers at a pressure equivalent to 150m with various levels CO₂ in the breathing mixture and found a decrease in performance when the CO₂ level exceeded a surface equivalent of 4 per cent. Unfortunately no one has measured CO₂ levels generated by a diver in practical work situations, so it is difficult to predict in what circumstances CO₂ build-up would affect performance underwater.

Anxiety: This is a problem which many divers are reluctant to discuss or admit to, although it is to be expected in new or dangerous diving situations. Threats such as the presence of sharks, currents, polluted water, poor visibility and the like are important in this context, not because of the true degree of risk associated with them but because of the apprehension they arouse in the diver's mind. The narrowing safety margin with increasing depth is responsible for many diving fatalities, and this factor is also a stress for the diver insofar as he is aware of it. Anxiety can be detrimental to diving performance. This is demonstrated in a study by Weltman, Christianson and Egstrom (1970), who found that novice divers on their first ocean dives took 26 per cent longer to complete a complex assembly task than did experienced divers. This increased time was related to the anxiety of the novice divers.

Experienced divers in a new situation may also be affected. In a simulated dive to 183m Biersner and Cameron (1970) found that highly experienced US Navy divers breathing helium-oxygen suffered impairment on a memory task which was attributable to the stress of the dive. In a recent study using experienced divers Davis and others (1972) concluded that anxiety affects manual tasks more than mental reasoning - opposite effects to those of narcosis.

Cold: The effects of cold on diver performance have only recently been critically examined. Bowen (1968) in a comprehensive study on divers wearing 4.5mm (3/16 in.) wet suits in cold water down to 9°C found a loss in manual dexterity and mental impairment where the

task required intense attention and short-term memory. The decrease in diver performance for some of these tests is shown in Figure 3. During the tests the divers' shin temperature dropped some 5.5°C over a half hour period.

Other effects of diving in cold water such as diuresis (severe loss of fluid by urination), reduced ability to focus the eyes, and post-dive fatigue (which may last one to two days) have been noted in the diving literature but have not been studied.

Cold is probably one of the most important factors for divers on the southern Australian coast, where sea temperatures drop to between 9°C and 12°C in winter.

Perceptual alterations and distortions: The field of vision is severely restricted by the face-mask and by the natural magnification ($\times 4/3$) of underwater objects, and the diver has to learn to apply a correction factor in estimating their size and distance. In addition to these factors Baddeley (1968) found that visual acuity is poorer underwater than in air. This is due partly to loss of definition resulting from absorption and scattering of light from the object, and partly to the difficulty in focusing accurately. The latter difficulty arises because the conflict between real and apparent distance underwater causes focusing to become unstable, so that the image may go alternately in and out of focus.

The diver's hearing is less acute and the intermittend boom of escaping bubbles of exhaled air may mask other sounds. Further, without extensive practice he has difficulty locating the source of a sound under water. More information on perceptual factors can be found in a recent book by Adolfson and Berghage (1974).

Combination of Factors: In practical diving situations it is likely that more than one factor will be operating to impair performance. What happens in such a situation? Research on this complex question has only recently been undertaken, consequently information is sketchy.

In some cases the decrease in performance is additive: that is, the total decrease in performance can be predicted by adding together the decrease from each factor separately. An example of this comes from the previously mentioned study by Messer and others (1971). They measured performance in three separate conditions: (a) with CO_2 added to air at the surface; (b) with air in a pressure chamber at 55m; and (c) with CO_2 added to the air in a pressure chamber at

55m. They found that the decrease in performance in (c) could be predicted by adding together the decreases found in (a) and (b), a result contrary to the long held belief that CO₂ enhances the effects of narcosis.

In other cases factors interact to produce a performance decrease greater than would be predicted by adding together the separate effects of each factor. This is illustrated in a study by Baddeley (1966) who tested the manual dexterity of divers in three separate conditions; (a) in a pressure chamber at a simulated depth of 90 m; (b) in the sea at 2 m; and (c) in the sea at 90 m. Time to complete the task increased in each case, but was 20 per cent longer in (c) than would be predicted by adding together the separate times of (a) and (b). In this situation it seems that anxiety interacted with narcosis or the effect of working underwater or both.

CONCLUSIONS: If he understands and is able to predict in what circumstances performance may be hindered the working diver can take steps to circumvent potential problems. These steps may consist of -

- * dive preplanning and rehearsal to minimise mental effort in the water;
 - * task simplification to minimise decreases in manual dexterity;
 - * task aids such as a slate and pencil to minimise memory losses;
 - and
 - * the estimation of realistic diving profiles to allow for the extra underwater work time required to compensate for inefficient performance.
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