

PANIC

Dr Arthur J Bachrach

(Oceans 2000, 1973)

For some time Glen Egstrom and I have been working (on a somewhat negative aspect of diving - the destructive problem of panic. My remarks today are, in effect, a distillation of our work. About 120 sports) divers are killed each year in the United States and, of them, cave diving produces 25 - 30 deaths in Florida alone. There are perhaps two million divers, so this would not appear to be much of a statistic, but if you compare this with the five deaths each year in an equally popular high-risk sport - skiing - you will see why we wish to examine what is killing our divers.

The problem of panic has three elements: training, which needs to be improved in many ways; physical condition, which is becoming more and more a source of concern for us; and finally, equipment.

Most deaths occur at shallow depths or on the surface and are to be associated in very large measure with loss of control - panic. Most of the divers pulled out of the California waters still have their weight-belts on, yet when you look into the training progress it would seem to be automatic that a person should jettison his weight-belt to save his life. Certainly, they have enough air left in their tanks, but frequently the mouthpiece has been spat out, implying that there has been a loss of control on the part of the divers.

This is not only true for sports divers, it also applies to a number of deep divers. Commander Carpenter will certainly remember concerns expressed by some of the divers on Sealab II: about scorpion fish, loss or failure of equipment, failure of CO₂ sensors. These are things that are beyond the control of the diver but, above all, his greatest concern must be a personal loss of control, which would mean that it was beyond the diver's capability to handle a problem.

Competence and self-confidence seem to be the two things that are important in controlling panic. When an individual, who is basically a land mammal_wearing strange equipment, is in trouble in the water, he will begin to struggle - clawing the water, with his head held back, struggling to keep out of the water. He has spat out his mouthpiece and still has his weight-belt on. The hard struggling results in keeping the head higher but also increases the weightload, and the body responds by increasing the heart and respiration rates. Therefore, the individual rapidly reaches the state where he cannot possibly sustain this excessive workload, and becomes exhausted. It has been estimated that an individual can sustain a workload like this for less than a minute, and exhaustion can bring an additional psychological stress which will mean he may or may not be able to perform another manoeuvre such as ditching the weight-belt or inflating a flotation device.

We have a theory, which is unproven, that it may well be psychologically antagonistic for a diver, with his hands up and trying to keep his head out of the water, to put his hands back into the water to release his weight-belt or to pop the CO₂ cartridge. It could be that in engineering equipment, it would be more practical to have such a safety feature on the shoulder or closer to the head.

Following work at the Royal Naval Physiological Laboratories at Alverstoke, Peter Bennett and I, working at Duke University, conducted further research into the subject of apprehension as experienced during deep dives. We prepared a special analysis of a tremor and with diver-operated force transducers measured the psycho-physiological changes experienced by divers in a chamber at 870 ft.

The results showed that the professional divers, who had been saturated for a while and were resting and waiting to travel to 1000 ft, produced peaks at 3-5 Hertz. The normal frequency at which this takes place being 10 Hertz, this suggested a pathological tremor which does not necessarily mean that the individual has suffered any permanent brain changes, but that he was experiencing what we may loosely call 'apprehension'.

As they began to compress to 1000 ft, the tremor and their level of performance returned to normal, suggesting that the divers' stress had been experienced prior to travelling on compression.

During an evaluation of the Mk XII, which is a system that the US Navy may adopt to replace the old Mk V copper diving helmet, we listened to a diver's heartbeat while working a UCLA pipe puzzle in very clear, warm water with a three-quarters of a knot current. As the telemetry recorded back through the 60 ft deep water, Glen Egstrom, with whom I was preparing the preliminary data, remarked that the diver probably hadn't been in the water for a while. On checking with the Director, we found that the diver had not been in the water for about six months. What gave Glen this suggestion was that we were peaking 184 beats at one point where he was working the old Mark V on the pipe puzzle. The normal moderate workload would probably be about 140, and the marked increase in heartbeat suggested that the diver was not in good physical condition, had not been in the water for a while, and was not functioning effectively.

If we study this aspect of stress, knowing that it is normal both to professional and sports divers, we would assume that training is reflected in competence. Competence is also a reflection of physical condition, and if you have a diver who is what we call in the United States, FOB (fat, old and balding) he should not be in the water, or at least the dive instructor should be aware that there are going to be problems.

We feel that swimming pool training is not sufficient for ocean divers and that specialities such as cave diving also require further training. There is a need for intermediate kinds of training in between pools and oceans - perhaps in controlled coves or quarries, or some area where an individual can get into more open water than the controlled, safe aspects of the swimming pool.

How automatically one performs a task is very relevant to the experience of apprehension and panic. It is important that a task be learnt to the point where a diver no longer has to give it much thought, so that he is relaxed and not continually concentrating on moving the equipment, or himself, through the water.

There is an important aspect of training which I think relates very definitely to the psychological problems that we meet in sports divers, and that is the aspect of condition. Any individual who thinks that he is going to compete by saying that he has gone further on less air than another diver, is a dangerous diver; he should be competing with himself in terms of his own skills and abilities, and not in terms of depth and air consumption. With regard to this aspect of competition, one should be aware and cognizant of the fact that one of the main motivators of human nature and behaviour is the fear of looking foolish, and it is important that dive instructors stop individuals from taking chances, or from getting into situations in which they may get into trouble because they don't dare not to go.

We have talked about transportation - the means of getting down to the particular brand of diving in which we are interested, the equipment, and certainly the

social aspects of diving, all of which are important aspects of training and the enjoyment of the task. Finally, let me turn to the task itself, which is one of the problems in sports training that has still not been resolved. We have trained people to use equipment to get down to depths, but we have never trained them really systematically to do anything.

To help control apprehension and panic a diver should have a function, whether it be underwater archaeology, shell collecting, observation, photography or ,whatever, so that he is not just down there listening nervously to the harmonics of his regulator, but rather, absorbed in taking photos or in doing something purposeful.

Herb Prosser believes that hyperventilating is one of the least recognised but most important causes of drowning. Certainly, the diver who is clawing the water and trying to get fresh air instead of tank air may hyperventilate, which causes all sorts of physiological changes including, possibly, passing out within very short period of time.

We also feel that there is some evidence that hyperventilation and hypoglycaemia have similar types of physiological effects and it may well be that some dietary aspects of hyperventilation and control may be important, so that beer may not be the best thing to have just before a dive.

Let me turn to one other aspect of what happens when an individual gets into a panic situation. Under stress, an individual's narrowing of perception is quite marked, he begins to focus in an almost tunnel fashion, losing peripheral vision to a very marked extent. Not only is the vision narrowed but his problem-solving capabilities are also narrowed. Picture a diver whose reserve valve had been accidentally pushed down while he was working among rocks: he may start to breathe a last hard breath and put his thumb on the handle of the pull release. Nothing happens because his reserve is already pulled: a non-coping response occurs - he keeps pulling, with no results, and begins to panic. Once you have this stereo-typed response, any problem-solving becomes almost impossible. There was a case in Tucson, Arizona some years ago of a woman diver who was drowned in 12 ft of water in a lake on a golf course. When she was pulled out she not only had on her weight-belt, she was clutching a bag of golf balls. This is non problem-solving behaviour and very hazardous, but it happens, and this is one of the things we are puzzled by in psychology.

We know a good deal about experienced and inexperienced stress responses. Some years ago a couple of psychologists did some work on sky divers and found that the experienced sky divers were frequently apprehensive about going out and doing a jump. The interesting thing about their research was that the apprehension occurred usually on the morning of the jump and if they felt sufficiently apprehensive they would call and cancel, whereas the novice would peak their anxiety just before the ride to the jump site. So, there was a temporal difference in the apprehension of the two types of divers. Again, there may be some factor about looking foolish and not wanting to cancel. I have a feeling that there may be this parallel between sky and scuba divers: the gallows humour that you see on the way to a dive site may well be the kind of apprehension release that the novice divers require. Probably, the experienced scuba diver who didn't feel too comfortable about going out, doesn't go whereas the novice diver tries to overcome it and peaks his anxiety just before he is about to dive. These are things that a dive instructor should be aware of and do something to control: to cure the need for foolhardy face-saving and to be thankful for sinuses and colds, because they always provide an excuse for getting out of a dive.

Finally, I would like to mention what I think is going to happen with regard to sports diving in the future, and I'm going to say a couple of things which I am sure are controversial. I know that there is an argument about controlled emergency ascent or free ascent: many of us believe that there is a very critical need for training in these areas, and the US Navy and the Royal Navy are not very positive about this. However, for many of us interested in sports training, the controlled emergency ascent is a very important potential lifesaver.

Secondly, I foresee that there will be less and less training in sharing (buddy breathing) and more and more development of equipment similar to, but more efficient than, the octopus rig. Buddy breathing not only causes concern about the buddy who is running out of breath and the return of one's regulator, but is also an inefficient method with which to handle this emergency situation.

Diving is a fine sport. With proper physical conditioning, equipment and training the individual can expect much excitement and pleasure in diving - but let's be certain the excitement is of the positive kind.

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Brief Profile

Dr Arthur J Bachrach is the Director of the Behavioural Sciences Department of the Naval Medical Research Institute, Bethesda, Maryland.

His diving research activities are largely concerned with deep dives and have been centred around experimental methods of assessing behavioural and physiological changes in divers.

He has been involved in research on the 1000 ft Westinghouse chamber dive in 1971 and, as Visiting Investigator at the Institute of Environmental Medicine, a 1200 ft chamber dive after that. In 1973, he collected tremor data on the Navy/Taylor 1600 ft chamber dive.

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NOTES TO CONTRIBUTORS (BUT NOT OURS!)

The Editor of the Federation of Australian Anarchists' "Bulletin" has advised pressure groups seeking space in his publication in the following words:-

"Comrades - only articles which provide interest for the people who type out these articles will be typed on stencils. If you think your articles are boring and egotripping then would you type them on stencils and then forward them to the city that is currently publishing the bulletin."

This information was noted in The Australian, 20th May 1975. Neither the Editor of The Australian nor of this Newsletter are making any comments.