CHAPTER THREE

SURVIVAL.

Safety at Sea.

"Less than three there should never be". There is safety in numbers though of course the group does not want to be too large unless there are a fair proportion of experienced paddlers to assist.

The following points should be considered by anyone leading a sea expedition.

1. The ability of the group. The party is as strong as its weakest member. It is said that an inexperienced canoeist will lose control of his canoe in winds any greater than force three (8 - 12 m.p.h.)

   Personally be aware of the members' ability - do not go on hearsay.

2. Have all the necessary equipment and ensure that it is all in good condition.
3. Have adequate buoyancy in the canoe - at both ends.
4. Be visible at sea - use a brightly coloured canoe, anorak and hat. That is, colours at the red and yellow end of the spectrum.
5. I have already mentioned clothing. If you make your own wet suit there is usually enough material left over to make some wrist bands which should be worn over the cuffs of your anorak.

   A lot of body heat is lost from the head and neck so wear a hat, and protect the neck.

6. Be able to understand weather forecasts and predict local variations (more of this later).
7. Understand the sea, that is, know about tides, over-falls, currents (again, more later).
8. Understand navigation, rules of the sea, buoyage.
9. Plan your trips well, building in escape routes whenever possible.

10. Let the Coastguard know your plans. He will ask for:

    Number of party.
    Colour of canoe.
    Destination.
    Time of departure and estimated time of arrival.
    Whether you are carrying flares.
    Phone number of a third party (he may contact in emergency.)
    Name and address of leader.

Have all this information ready before you 'phone the Coast guard. Do not forget to contact him when you have completed the trip so that he knows you are safe. Safety at sea, like everywhere else, needs education and common sense. Take the B.C.U. Sea Proficiency Award, apply logic and there you have it ! !

COLD WATER IMMERSION.

Before going on to the subject of exposure or hypothermia I thought it worthwhile to include a little on the effect of cold water immersion.

Much work has been done on the problems of physiological variations caused by immersing part or whole of the human body in cold water. It was hoped that as a result of this work improved clothing and equipment would help save life.

The human body endeavours to maintain an even temperature, if it becomes too warm then sweating helps to keep the blood at its normal temperature. When the body becomes cold then blood flow to the surface is reduced. The human blood circulation can conveniently be divided into two parts for explanation purposes. One part will be called the peripheral system which supplies blood to the muscles, limbs and skin. The other part will be called the inner system where the blood or core temperature is maintained around 36.8°C (98.4°F). The inner circulation supplies blood to the vital organs such as the liver, kidneys, lungs and the brain. There is a tolerable variation in the core temperature but if it falls below 30°C (86°F) then consciousness is irrecoverable and death inevitable. Even a slight variation in core temperature, however, does affect

normal behaviour patterns. Essentially it is the brain which is affected first as a result of the blood being cooler than normal. It manifests itself by an interference in some of the higher mental processes such as vision, balance and speech. Blurred vision, disturbed balance and slurred speech are some of the more common signs of exposure setting in. The two systems of circulation behave differently.

If the body is exposed to cold conditions then it protects itself by reducing the peripheral blood flow in an attempt to prevent the blood from being cooled. The inner system continues to flow in the normal manner. After a while, however, which varies from person to person, a strange phenomenon takes place. This strange reaction has been called 'Cold Induced Vasodilation'. The blood vessels were initally closed or constricted as a result of the cold, now dilate or open and allow the warm blood to flow back to the extremities. This dilation process can take place locally in the hands for instance or on a larger scale maybe the whole body.

If the external cold conditions are still prevalent when the blood vessels dilate in a large area then it is obvious that eventually there is going to be a drop in the core temperature. Many lives have been lost in this way, the cold has not only cooled the blood but accompanying shock has overstressed the nervous system which in most cases has resulted in heart failure.

The mechanism involved in cold induced vasodilation is essentially a protective one for the extremities, such as the nose, ears and cheeks where the blood supply to those exposed areas in cold conditions is reduced. It is interesting to consider that the protective mechanism can result in disaster especially when the victim is immersed in cold water because here the cooling effect is even greater than in air.

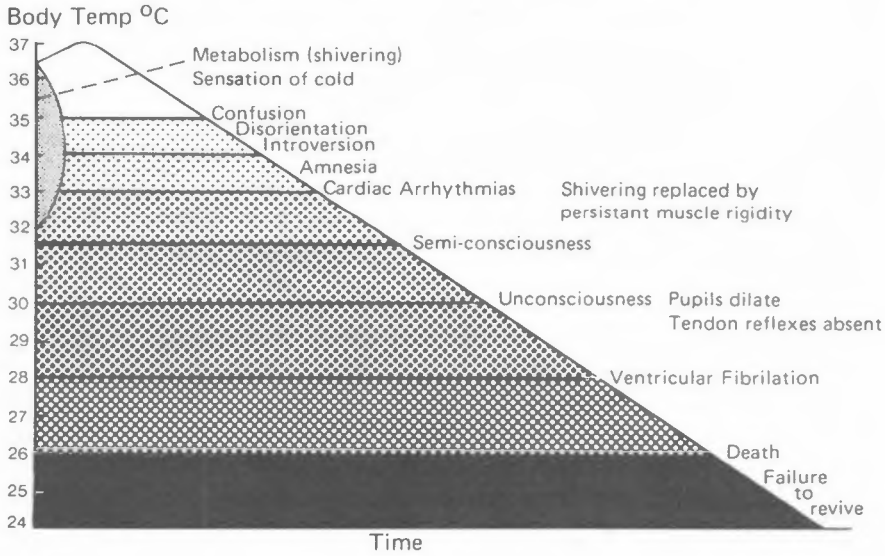
It has been shown that diving in cold water increases loss of memory functions and in the ability to move. In the latter case most canoeists have experienced difficulty in moving fingers after being in cold water. Some people can tolerate cold water for a longer time than others, and this is mainly attributed to subcutaneous fat content. A superbly fit athlete will not be able to remain in the water as long as a canoeist who supports a substantial 'beer-gut'. However, some people have adapted to the cold. For example Korean diving women seem able to restrict their peripheral blood flow presumably with the onset of cold induced vasodilation, consequently losing little heat while in the water.

Many canoeists experience cold hands during the winter, and each person develops his own remedy. It may be useful to note that it has been found that face warming causes a significant rise in hand temperature. It has also been found that physical fitness affected the levels of cold tolerance. It is obvious that a person who is warm prior to going on the water will maintain his peripheral blood flow for a longer time than a person who starts off cold. It is therefore desirable to do some vigorous exercise before venturing on the water in cold conditions and it is a fallacy to think that this may use up energy reserves - in fact it makes them more readily available. There is indication that a certain amount of cold acclimatisation takes place in the extremities except for the ears. In other words, if a person constantly exposes his hands for example, in cold icy water he will eventually be able to tolerate cold water conditions more comfortably. It has been shown that extra body insulation is of little consequence to the rate of cooling of the extremities.

One of the main areas of body heat loss is from the head. Some physiologists state that at 40°C (104°F) (air temperature) the heat loss from the head may amount to half the total resting heat production. The back of the head is particularly vulnerable, thus a life jacket collar helps here.

Distributed over the body are nerve receptors for various functions. Some receive the sensation of heat, some touch, some

SYMPTOMS AND SIGNS IN ACUTE HYPOTHERMIA



are for pain etc. In some areas of the body there is a greater concentration of receptors than in others as in the lips and finger tips. Conversely in other areas receptors are scarce. The head is such an area. Few cold receptors in the head make the canoeist unaware of the amount of heat which he is losing. It is not only very important to protect the head from the cold, but protecting the head by a certain amount of insulation is equivalent to protecting the rest of the body with twice that amount of insulation. In other words - if you want to keep your head in cold weather - wear a hat.

Having discussed in some detail the physiology of the body's reactions to cold I will now look more directly at the subject of hypothermia in terms of its detection and treatment.

EXPOSURE

The sea canoeist may often feel cold, wet and uncomfortable. The next stage is known as exposure. Exposure is diagnosed when the temperature of the body's core (i.e. brain, heart, lungs etc) drops to 35°C (95°F). This state of affairs is often called cold induced hypothermia. Normal body heat is 36.8°C (98.4°F). I shall tackle this subject under four headings - CAUSES, PREVENTION, DIAGNOSIS and TREATMENT.

Causes.

A canoeist may be exhilerated by a cold sunny morning without wind and sets out for a coastal trip. He is comfortably clad and paddling well. After some time a wind begins to blow, and he may shiver. A cloud then obscures the sun, and spray or rain, soaks his clothing in a short space of time. He begins to chill and makes extra effort to warm up, to continue or to return. The rain may change to sleet or snow and he is becoming fatigued. He may become a casualty owing to the cold, though the air or shade temperature need not have altered over this period of several hours.

Exposure is simply caused by becoming too cold. This happens by accident, because of ignorance, inexperience and incorrect equipment.

Prevention.

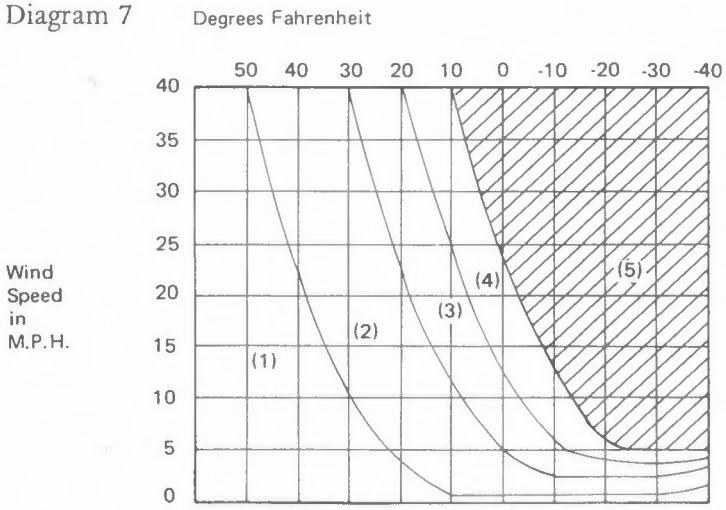
The prevention of exposure is really quite simple, but then many accidents occur due to ignoring the basic principles of safety. First be adequately clothed. Remember clothes do not warm the body, but merely reduce heat losses from it. Secondly do not tackle too

much too soon. Tiredness assists the onset of exposure as does prolonged periods of cold and wet. Thirdly have facilities to prevent exposure like hot drinks, emergency rations, dry clothing and a polythene exposure bag. Fourth, have a good meal before setting out. This provides a reservoir of energy for several hours, and energy means warmth. Fifth, - know about exposure.

THE CHILL INDEX

From the chill index it can be seen that it is possible to quantify the cooling effect of cold environment by measuring air temperatures and wind speed. In the water the wind effect is negligible, but heat may be lost twenty seven times faster than when the body is in still air at the same temperature. This is where the wet suit comes into its own; by trapping water between the skin and the suit. It often pays to remain still when heat conservation is the aim, as moving around changes the water in between the skin, and wet suit or clothing.

Diagram 7



1. Comfortable with normal precaution.
2. Very cold, travel uncomfortable on overcast days.
3. Bitterly cold, uncomfortable even on sunny days.
4. Freezing of human flesh begins, depending on degree of activity.
5. Survival effort required.

Diagnosis.

The development of hypothermia is often insidious and early detection can be difficult. It is normal for members of a party to complain about coldness and fatigue when conditions get rough, so beware of the real thing. Once hypothermia sets in death soon supervenes unless something is done to reverse the process.

As hypothermia sets in there will be evidence of abnormal behaviour such as listlessness, lack of interest, general slowness and weakness with stumbling and possible numbness of the extremities. Later there may be complaint of cramp, nausea, vomiting, blurred vision and/or speech. The patient may be confused and lethargic making little or no attempt to help himself. A slow pulse rate may be detected and collapse is possibly imminent. If collapse occurs then shivering ceases, muscles stiffen and breathing becomes difficult. The pupils dilate and unless treatment is extremely prompt death is certain.

Treatment.

Treatment consists of simply getting the patient warm and dry by whatever means possible. If a hot bath is available, as at a Sports Centre, then immerse the patient in water at 40-44°C (104-111°F). The 'hot bath' treatment should be done under medical supervision if at all possible. The patients body and not their limbs is immersed. All in all it is a complicated subject; briefly what can happen is this – with the skin of the body suddenly becoming heated the 'core' of the body sends blood to the skin to effect cooling. This can cause a small but fatal drop in the body's core temperature causing shock and maybe death from hypothermia. The only possible justification for rapid rewarming of cases of outdoor hypothermia is in cases not of exhaustion exposure, but of immersion hypothermia (which are different conditions) and in cases where because of accidental complications or maltreatment, the patient fails to respond to the conservative treatment and a doctor thinks the risk of rapid rewarming is a justifiable last resort.

Hardly such luxuries as a hot bath are available to the sea canoeist, and the answer is to land, find shelter and warm the patient by any means possible. All the body requires warming. Do not massage arms and legs. Strip off wet clothing, apply dry, and sandwich the patient between as many people as possible in a polythene bag and/or tent.

Complications unfortunately are not unusual. Know how to administer expired air resuscitation (mouth to mouth) and cardiac

massage. It is well worth taking the advanced resuscitation award organised by the R.L.S.S.

Finally the patient should always be referred to a Hospital or doctor as soon as possible.

Hysteria

In many cases an element of hysteria is present. This is not to be confused with malingering. Unlike the latter it is the result of a sub-conscious desire to escape from intolerable conditions. Even though its presence is suspected, the full treatment must be given until the patient is safely disposed. The only damage done will be to the pride of the rescuers when faced with the apparent miraculous recovery of their patient when civilisation is reached.

This is a very brief outline of the subject of exposure. Before tackling sea canoeing do be aware of the dangers and the treatment of exposure, particularly if you ever intend leading and being responsible for a party of canoeing at sea.

RESCUE SERVICES

The following signals, used or exhibited either together or separately, indicate distress and need for assistance.

1 A gun or other explosive signal fired at intervals of about a minute.
2 A continuous sounding with any fog-signal apparatus
3 Rockets or shell, throwing red stars fired one at a time at short intervals.
4 A signal made by radio telegraphy or by any other signalling method consisting of the group S.O.S. (...---...) in the morse code.
5 A signal sent by radio telephone consisting of the spoken word "Mayday".
6 The international code signal of distress indicated by N.C.
7 A signal consisting of a square flag having above or below it a ball or any thing resembling a ball.
8 Flames on the vessel (as from a flaming tar or oil barrel)
9 A rocket parachute flare or a hand flare showing a red light.
10 A smoke signal giving off a volume of orange coloured smoke.
11 Slowly and repeatedly raising and lowering the out-stretched arms at either side.
12 The radiotelegraph alarm signal.
13 The radiotelephone alarm signal.
14 Signals transmitted by emergency position-indicating radio beacons.

The use of any of the above signals except for the purpose of indicating distress and need of assistance and the use of other signals which may be confused with any of the above signals is prohibited.
The following signals may be able to be used depending on the size of the boat and the equipment carried.

1 Ensign hoisted upside down.
2 Ensign made fast high in the rigging.
3 A coat or any article of clothing attached to an oar or paddle and allowed to blow out horizontally.

H.M. Coastguards.

H.M. Coastguard is the authority responsible for initiating and co-ordinating the search and rescue measures for all vessels in distress off the coast of the U.K. The area over which this responsibility extends approximates closely to that which can be reached by long range aircraft capable of operating up to 1,000 miles from the shore, and is bounded by latitude 45° and 68°N., by longitude 30°W, and by the adjacent areas of our European neighbours to Eastwards. For details of Coastguard Stations see Chart 5071.

The Royal National Lifeboat Institution.

This organisation is supported entirely by voluntary contributions and maintains lifeboats and inshore rescue boats round the coasts of the U.K., Irish Republic, Isle of Man and the Channel Islands. When a lifeboat is launched on service it is able to pick up distress radio signals and, if necessary, speak to other ships or authorities who are also concerned with the search and rescue action. Lifeboats of the R.N.L.I. are now fitted with a quick-flashing blue light exhibited from the masthead, showing at least 120 flashes per minute.

The Royal Navy

The Navy will assist casualties by means of surface craft and aircraft, including helicopters.

The Royal Air Force

The Air Force operates through the Rescue Co-ordination Centres at Edinburgh and Plymouth. It is responsible for providing rescue facilities for military as well as civil aircraft, but also, as far as operationally practical, will assist ships in distress by means of long range search aircraft and helicopters strategically stationed to provide S.A.R. cover.

Sea Rescue by Helicopter.

When a distress call is received by the Coastguard steps are at once taken to send all possible life saving assistance. This may well include asking the nearest R.A.F., R.N. or civilian helicopter station to despatch a helicopter to render assistance. It is important to make yourself as conspicuous as possible once you sight the helicopter, (e.g. by the use of dye on the water, out-stretched poly bag, flares, torch, etc.) Because of their operational limitations, helicopters should not be unnecessarily delayed at the scene of the rescue. The helicopter will approach heading into wind. On no account paddle towards the hovering helicopter. Remain still and await instructions. The pilot will have judged your position and drift and will be manoeuvering without necessarily being able to keep an eye on you, so stay put. An indication of wind direction is useful. A strip of cloth should suffice. Do not cloud the issue with a smoke flare.
Helicopter crews are well practiced in rescuing survivors from either a deck or the sea. I have discussed the techniques of rescue from a canoe with an experienced R.A.F. helicopter winch-man, and he is of the opinion that as a general rule it is best to clamber out of the canoe into the water, hanging on to the canoe until instructed to let it go. There are a couple of good reasons for doing this; the canoe with you in it would be blown away by the down-draught, and you are easier to winch direct from the water rather than from your canoe in which you might be wedged. The survivor is rescued by means of a strop. The crewman is lowered from the helicopter together with the strop which is secured around the survivor's back and chest, and both are winched back up into the helicopter.
Finally, remember that a helicopter cannot remain airborne indefinitely watch for and carry out the winchman's instruction exactly and immediately.

DEEP WATER RESCUE TECHNIQUES.

I do not intend to give lengthy details of how to complete each deep water rescue technique. There are two ways of finding out for yourself - read the detailed explanations in books already available (e.g. Chapter 14 of LIVING CANOEING by Alan Byde) or be taught by an instructor. Both ways combined are best.

'The Roll.'

Every sea canoeist who intends to embark on extended expeditions should be able to roll. The leader must be able to roll. To roll simply means that after a capsize the canoeists remains in his canoe and uses his paddles against the water to right himself. The roll is the best method of self rescue and should be practised in rough sea

conditions as often as possible so that it becomes a natural response in the event of an accidental capsize.

A heavy gust may be so sudden as to cause your paddles to slip away and capsize you. The technique is to reach behind you for your spare blade - half of it will do, and use it to roll upright. This procedure is well worth practising.

The Rafted 'X' rescue.

The paddler has capsized and left his cockpit in the middle of the Bristol Channel. Now what ? Remember - less than three there should never be. The chances are that rough conditions caused the capsize so the procedure is as follows.

The two upright canoes raft together. This gives a stable 'platform'. It would really take a freak sea to capsize a couple of rafted canoes. To raft together the canoes come alongside, paddles across both cockpits, and one hangs onto the others canoe. Both face the same way. Now the canoeist not involved in holding the raft together grabs the bow or stern of the upturned canoe, having instructed the chap in the water to hang on to the raft, and pulls the upturned canoe over the raft and empties out the water, places it back the right way up in the sea and the canoeists to be rescued clambers back into the cockpit, the boat being held steady by the rescuer.

A few points emerge from doing this or any other rescue.

1. Should you capsize and cannot roll, at least leave the cockpit carefully to prevent water spilling in.
2. Do not let go your paddles, and grab the upturned canoe immediately.
3. At this stage you will be thankful for a life jacket, a wet suit, deck lines, and a crash hat as well as plenty of buoyancy in the canoe, and all your kit securely stowed.

You may also curse a deck mounted compass as it gets dislodged and drops to the 'Davey-deep'. You may also curse a deck cluttered with flares, spare paddles, fishing line etc.

'X' Rescue.

One canoeist can rescue another using the'X'method quite easily. Instead of being rafted up with a second canoe he simply parks his blade - so that he can grab it to roll upright should this become

necessary - and proceeds to pull the upturned canoe over from his own cockpit and empty it out and place it alongside his own for the rescued paddler to clamber in. The chap in the water should be able to assist by hanging on to the cockpit combing furtherest from the upturned canoe. From here he may counter balance the rescuer and be ready to grab his own canoe to assist with pulling it over the rescuers' cockpit.

Two points here:

1. One person must take charge of a rescue. His instructions must be explicit, and must be obeyed - unless it is obvious he does not know his paddle from his spray deck ! !
2. Practise often, and practise in rough conditions whenever safely possible. It is all easy stuff in a swimming pool, but to do it when there is tide against a strong wind causing noise and turbulence while drifting rapidly on to a cliff side is another matter.

Swimmer to Canoeist.

Here a canoeist has overturned, remained for whatever reason in his canoe and is rescued by a swimmer who reaches over the upturned hull, grabs an arm or life jacket, pulls hard and rights his patient. Too hard a pull can cause dislocation of the shoulder. This may be prevented if the upper arm is grabbed as opposed to the forearm. Speed is essential and a dislocated shoulder will heal, whereas drowning is irreversible. At least be careful when practising. This method is just as easily completed by another canoeist who parks along-side the upturned hull and reaches well over to grab clothing, or life jacket, hauls up and rights the capsized paddler. When practising these rescues the victim should behave as though unconscious.

'TX' Rescue.

This rescue is useful if the capsized canoe becomes swamped. By turning the cockpit of the swamped canoe towards the bows of a rescuer who paddles his bows into the cockpit, the patient is able to lift and push his canoe over the foredeck of the rescuers' canoe. He now swims to the end of his canoe out of water and heaves down to empty it. Now conditions are as for 'X' Rescue.

Remember

1. This needs active patient participation, all very well if he is fit.
2. A canoe full of water is very heavy - could crush a deck.

Eskimo Rescues

Fully explained in Chapter 11 on Utilising a Swimming Pool.

'H' Rescue.

Two rescuers line up parallel to each other on either side of an upturned canoe. One grabs the bow, the other the stern, both alternatively lift, emptying the canoe. This situation forms an 'H' when the canoes are seen from above.

It is easy enough for one or both of the rescuers to capsize as they haul up on the upturned canoe. This is avoided if each rescuer is able to raft up with another canoe. This now means four canoes are being used to rescue one.

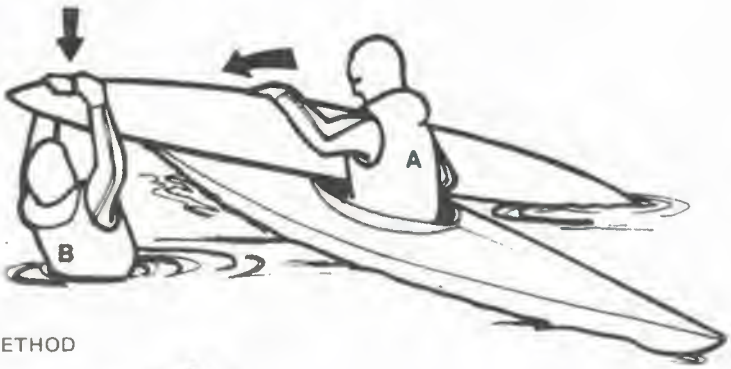
'HI' or 'Ipswich' Rescue.

Should a canoe capsize and present only its bow or stern pointing upwards above the surface (Cleopatra's Needle) due to inadequate buoyancy then this method of rescue is useful.

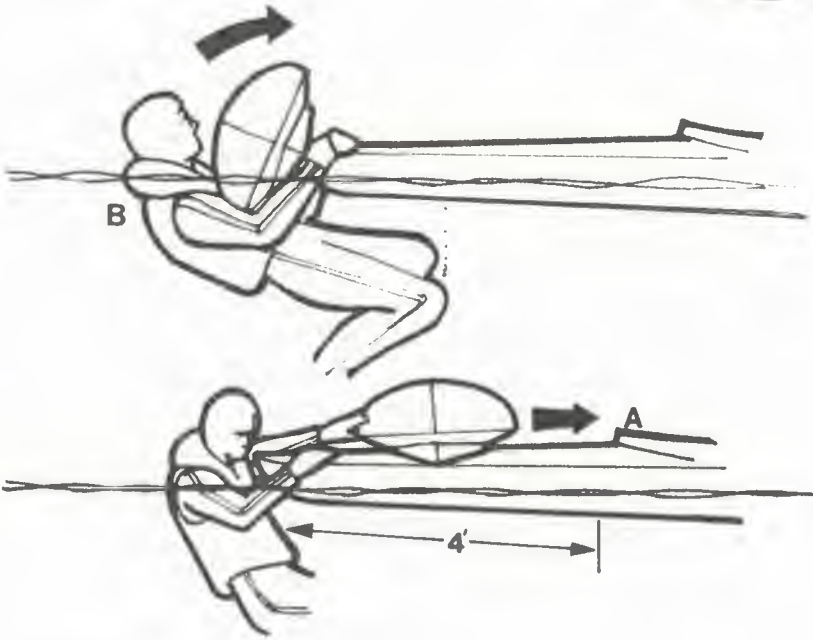
Again the two rescuers line up parallel either side of the upturned canoe, the two rescuers placing their paddles across their foredecks. The idea without going into too much detail is to pull the upturned canoe over the paddle 'bridge' so formed by the rescuers'paddles, rock the boat empty of water and placing it dry and upright allow the patient to clamber aboard.

Remember I have only given a brief outline of some of the more important rescue methods used at sea. Should you ever lead a party be able to rescue yourself and others first time, efficiently and rapidly. The know how and plenty of practice breeds confidence. You will need plenty in the middle of the Bristol Channel.

THE 'X' METHOD

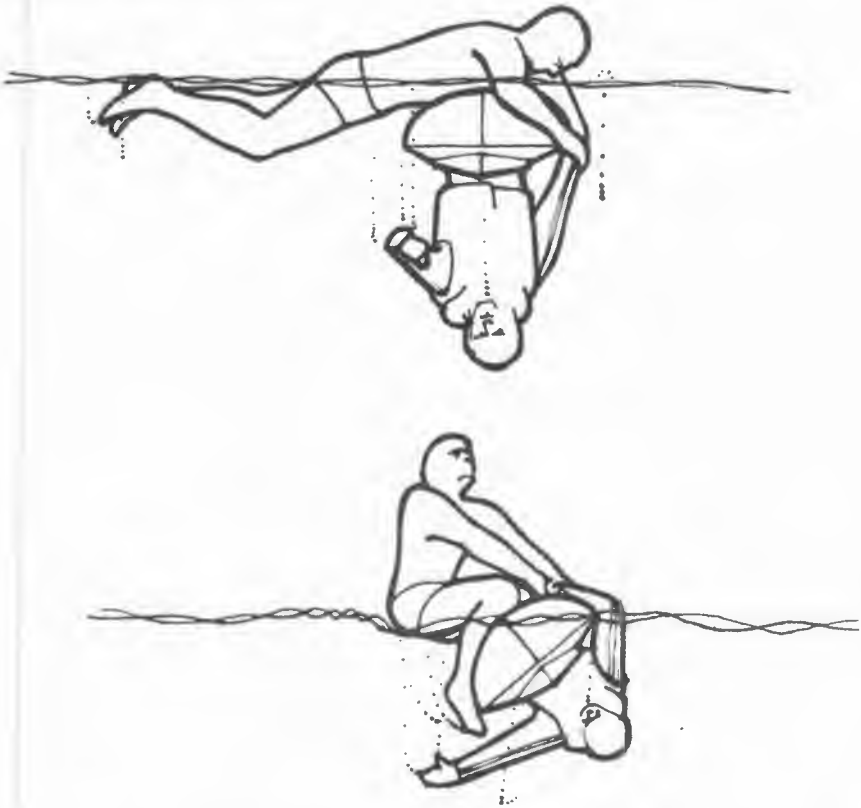


'TX' METHOD



THE 'H' METHOD

SWIMMER – CANOE RESCUE



'HI' METHOD

Photograph by David Hazeldene, St. Austell