

SEA WATER TO DRINK OR NOT:

THE BOMBARD EXPERIENCE

900 ML OR 32 OZ./DAY:

The Dr. Bombard remembered the Kon-Tiki experience which had demonstrated that the Incas had been able to cross the Pacific on rafts to establish colonies. Thor Heyerdhal had put in evidence the great qualities of a good raft.

From now on the sailors could put their trust in those planks which were supposed to be submerged by the waves at the very start.

The Norwegians had also forced the specialists interested in survival questions to also admit that anyone could easily fish in mid ocean which was supposed to be impossible.

Also they had collected and eaten plankton which is food for fishes even whales like grass is used for cattle etc. Today the general opinion has changed much as far as the sea. It is not treated as a desert rather a food mine. We admit that 1 square metre of the ocean is 200 times richer than the equal surface on land.

However the Kon Tiki experience even if it would reassure the sailors as far as the embarkations were concerned, it did not reassure them as far as the survival possibility without food and especially water.

Since a shipwreck is an accident sometimes so brutal that the castaway has not had the time to get either food nor water.

No one till the last few years would have dared to pretend that a man alone on a dinghy could survive without any food nor water.

Sea water was considered as deadly poison causing diarrhoea and the #nephrite# which is **VERY DANGEROUS** for the kidneys.

Numerous shipwreck showed sailors drinking salt water to quench their thirst and became crazy & died in horrible pains.

This was the sad story which compelled the castaways to abstain touching the sea water, so they could survive 30 days without food and only 10 days without water.

Yet Bombard also knew the danger of the sea water but also that some countries especially Germany used sea water cures and that for many persons sea water was used as a remedy.

So one day he asked himself if that drink was as dangerous as pretended. One day his motor dinghy ran out of gas in the middle of the Manche at the height of St. Valery.

He stayed 24 hours and drank a bit of sea water which quench his thirst without giving him any trouble; then he later was rescued. This result hit his medical spirit so much that he decided to try out an experience.

If a man can support a certain quantity of sea water every day and that he can fish while he is being carried out maybe he could hold on long enough till rescue arrived.

Living of the sea resources a man could subsist more than a month in a decent state, thus the research for any castaways would not be abandoned before 2 months and not 10 days as it is generally the case in the merchant navy.

But no one wanted to admit such a possibility and as the Kon Tiki. Bombard would have to be the man to test his theory with his own life in becoming voluntary shipwreck. First, in Monaco, he worked on diverse feeding experience.

He drank some sea water and noticed that he became sick (diarrhoea) after he had drunk more than 900 gr. of sea water, nearly a bottle a day.

Besides he noticed that he could not drink it more than 5 days in a row. What then would happen to the castaway?

Well then he could find water contained in the fishes. We know now that the water from the fish flesh is nearly soft.

So Bombard made a special fish press which he could draw a maximum of water but in order to do this, Bombard would have to find at least 3 kilos of fishes per day in mid ocean.

Besides he knew that Plankton could easily be gathered with a net weaved very finely and to let it trail behind his raft although any clothes even his shirt would work just as well.

So he came to the conclusion that the sea would give him nearly all what his organism would or could need.

He made his preparative after running all kind of troubles mainly that the world took him for a nut case.

His embarkation was pneumatic raft bigger than a dinghy measuring 4m.60 by 1m.90 wide in a horse shoe shape. The round part at the front was resting upon separated floaters which had 4 water tight compartments.

It had a wooden floor, a tent, a small mast and radio which he could listen to tell time and enjoyments.

Bombard was also carrying some medicaments and a bit of food and some soft water in Jerry cans but all that was boxed in & seal by a bailiff.

So that if he wanted to cheat, it could be found once he would arrived just by checking the seals. Bombard had no intention to cheat and was taking no chances. The 2 men had baptised the raft L'Heritique."

Their intention was to reach Spain. But the specialists thought that they would be deported to Corsica, and evidently they were to be found wrong.

Bombard and Palmer had all the possible difficulties to leave the coast, they **NEVER** really succeeded, the sea did not want them, and kept bringing them back to shore.

Bombard was saying: How hard it is to become castaway in those waters. They sailed along the coasts till June 7th eating only plankton and drinking only a bit of sea water. They had lost considerable weight but were alive.

They met a ship which stopped "Sidi Baruch" Its captain got mad and when Bombard asks for some food, he was mocked once more "We told you that you wouldn't succeed".

Bombard did not answer; he took the food and went back to the Heretique and while the ship sailed on, they ate that food under the laughs of the travellers.

Bombard had capitulated, he had not gone to the end of this trial. Yet it was of no real importance since it had been 14 days from their last meal on land.

Beside 14 days was already really quite convincing and the coast of Spain was only a few km away. Sure they had lost weight, but had not become crazy nor were they complete wreck nor near death.

Bombard hid his pride and judge that the joke had lasted long enough. The winds had brought them left then right and they were going around in circle, so the Mediterranean was a lousy sea and she was poor in fishes on top of that.

What would a castaway do if lost in that sea, said a doctor? They would do like us and would certainly last longer than 15 days and 6 hours would not go by before they meet a ship because this sea is infested of ships which makes it impossible to play as a castaway in those conditions.

It is not in the Mediterranean that one **MUST** try a survival experience. No? Where then? Bombard answered: In the Atlantic ocean.

Sometime later, Leaving the small town of Las Palmas in the Canary Island, Bombard alone this time, since his companion Jack Palmer has refused to follow.

Previous to that, Bombard had reached the Canaries from Tangier Morocco in 11 days aboard a smaller raft, beating previous record of 14 days by Alain Gerbault and Ann Davidson in 29 days.

Now he faces the great Atlantic ocean. His goal to reach Barbados from the Canaries. His average speed was 3 knots 1/2.

As he said, he fished every day then he drinks from time to time his sea water ration or sucks the soft water contained in fishes.

Having no stove, he eats raw his catch. This pinkie flesh does not look so great to taste but its taste is not unpleasant.

He also notices with pleasure that the sea water of the Atlantic ocean is much less salty than that of the Mediterranean and has no diarrhoea.

As a good Doctor he can observe himself scientifically better than anyone else not being a doctor. Each day he takes his pulse, his tension, observes his tongue and the reactions of his skin but does not notice any signs of poisoning.

Sure he loses weight but the regime he follows is not the type made to better one's health, but he is far from dying of hunger nor of thirst.

With great satisfaction he notices that he will be able to hold on. With his radio which gives him the exact time, he can establish his position, but soon his radio becomes wet and ceases to work.

His watch also gives up. He can no longer tell precisely his longitude which would tell him how many more miles before he reaches the Barbados.

But with the stars he still can tell his latitude (distance in degrees separating from the equator.) According to his calculations he thinks arriving the 28 Nov.

But at that precise date the earth does not show up, yet many birds turn around him, and a sword fish comes many times scratching his back on the Heretique and damages the floaters.

Bombard is not as reassured as the sailors of the Kon Tiki sailors and he thinks that a big treacherous wave could make him capsize and if at night it would be catastrophic.

During all his trip he was constantly with that fear in mind. Yet it **NEVER** happened, as it is often the case, **WHAT WE FEAR MOST, NEVER HAPPENS.**

Soon a storm arises. The raft is shaken in all directions, but his floaters act as suckers and stick to the wave. Bombard takes advantage of the rain to gather soft water and better his diet.

28 November is well past and the coast is still not in sight and the voluntary castaway is getting weaker. He is at sea much longer than he ever expected.

He has been 1 1/2 month at sea so far and living exclusively of the resources of the sea. If he ever was to die before being rescued no one would know that he has spent 40 days at sea and survived.

The wind has fallen, the raft does not move any more, the birds are still there and finally the 10 December 1952 a ship is in sight. A British ship "Arakaka".

Bombard using a flare to attract its attention, they rescue him, and the captain is dumbfounded to see that Bombard is still well alive.

Once the first moment of stupefaction past, he offers Bombard something to eat and drink.

Bombard thinks hard. Will he resist to the temptation, he **has been 53 DAYS AT SEA**, so far, he accepts a meagre meal then he goes back to his raft.

Bravo said the captain, I congratulate you, is there anything I can do for you when you reach Barbados?

Yes, said Bombard as he sails out: "The 6th Concerto of Bach Brandebourgeois. He will stay 12 more days at sea and they will be its worst.

Now that his stomach has been awakened by this normal meal, he feels the pang of hunger more than ever.

Finally the coast is sighted. **AFTER 63 DAYS AT SEA**, Natives gather around him and the raft and take him along.

Bombard is afraid especially for his sealed Jerry cans, for he thinks, if anyone opens them, they will think I have cheated and that I have open them during my voyage.

But the village teacher will save them on time. Bombard had won, he had proven to the whole world that a sailor even isolated in mid ocean could at the condition of keeping cool and using his brains live from sea produce for months if need be.

Today because of Bombard thousands of "Heretique" are aboard ship liners, waiting to be used in case of ship wreck.

TODAY THE SAILOR KNOW THAT HE CAN DRINK UP TO 900 ML /32 OZ.

ON THE CONDITION THAT YOU START DRINKING IT AS SOON AS POSSIBLE.

32 oz of sea water per day and that the plankton if he can not fish, is still available for his food.

He knows that the sharks will not necessarily eat him, and he knows as said Bombard that the sea is not hateful just merely indifferent.

SHIPWRECK IN COLD WATERS SPECIAL WARNING:

It is **CAPITAL TO KNOW** that a new drop of internal temperature to the order of 4 to 5 degrees will or can occur at the rescue moment and will last about 20 minutes.

This is due to the fact that the spontaneous #retake or provoked of the peripheral circulation activates the blood mobilisation# which was stagnant in the deep part of the body.

And it is this cold blood coming up to the **vital** centres of the #diencephale# which provokes the temperature drop under the lethal zone.

This explains the reasons so many were seen dying after having been rescued by war ships from the cold water.

Similar incidents were reported by fishing boats where the crew:

DID NOT KNOW THE ABSOLUTE NECESSITY OF A BRUTAL WARMING UP OF THE CASTAWAYS FROM THE COLD SEAS. IMMEDIATELY AFTER THEIR RESCUE.

REMEDY:

THE ONLY GOOD REMEDY consists in placing the castaway in a hot bath where the water is maintained at a temperature between 45 to 50 degrees Centigrade for **at least 10 minutes**.

If you have no bathtub, you can hose down the subject who is placed in a very warm place with water at 60C.

True resurrections were thus obtained from subjects who were in rigid state and whose heart seemed to have stopped beating.

If you have only warming pad #bouillotes chaudes# aboard a raft for instance.

You **MUST** put one under the neck cavity in order to prevent as much as possible the temperature drop in the **vital** centres and to act at the same time by reflex conditioning.

If you have several other hot pads, place them under the arm pits and between the legs at the groin.

Also because they are numbed by the cold & constant wetting the men **MUST be lifted aboard carefully to avoid injuries.**

BOZO LINE # 2:

Several members of the Kon Tiki expedition were nearly lost at sea through similar carelessness.

To have a look at their raft from a distance, they had climb into a small dingy, forgetting that it would be carried away from the raft by the wind and current. Paddling desperately they at last managed to get back to the raft.

From that day writes Heyerdahl, "it was strictly forbidden to go out in the rubber dinghy without having a long line made fast to the bows, so that those who remained on board could haul the dinghy in, if necessary."

We **NEVER** went far away from the raft therefore, except when the wind was light and the Pacific curving in a gentle swell.

UNLESS CASTAWAYS TIE THEIR RAFTS TOGETHER THEY ARE ALMOST INVARIABLY PARTED:

If they do keep together they are likely to have a better chance of surviving and the same goes for swimming in their life-jackets if they link arms and form a circle.

For one thing it will help to keep the weaker people above water and such a cluster is also easier to spot from a rescue plane than a solitary swimmer.

Death from exposure is made more likely by the lifeboat or raft being overcrowded as is usually the case.

SEA SURVIVAL:

Start by saving your strength. Lay down if possible in your raft. Moving makes you loose weight. 1/2 kilo of fat = 2 good meals.

In **Tropical regions**, shelter yourself from the sun if possible. Because the sun accelerates the evaporation thus your thirst.

A wet cloth over you face is good. Eventually while firmly holding or attaching yourself to the raft, dive in the water. This water contact will diminish your thirst. **Watch out for sharks.**

If alone on your sailboat at the runner or in a raft then: **It is a MUST** to tie a rope around you! One **NEVER** knows when a mistake can send you over board then it is too late. **BOZO LINE!**

RAFT OR BOAT?? :

The Kon-Tiki exact Incas reproduction of Thor Heyerdahl & his 5 men have proven in his Pacific expedition that:

RAFT ARE BEST!:

Boats tend to lean too much from one side to the next, they usually crash against the sinking ship haul, or they capsize with the first sea contact.

Rafts can be easily transported & thrown to the sea & THE RAFT NEVER CAPSIZE.

In a boat, one MUST ALWAYS draw the water out, unless it is the cover igloo type. A very grave inconvenient in a boat, NEVER in a raft.

The raft is shorter than a boat & perfectly flat, so it merges and weds the waves profile, coming up & down regularly.

Thor & his 5 friends took 5 months from Peru to Polynesia with the natural wind & currants, ahead of the most favourable prognostic.

Seamen told them, no fish at high seas. Probably because of the noise of today's ships.

But this flat raft noiseless pushed slowly by the wind & currants had all kinds of fishes around them to feed them nearly all the time. They proved that the Incas had done the same in the past.

STRANDED BOAT:

If dead in the water offshore, put out die marker in water, hoist distress flag, attach flare to boat-hook /stick, paddle, ignite flares & wave when needed. If in heavy seas, put out sea anchor.

MAKE SURE all passengers are wearing floating devices. If drifting toward beach, breakers, put out bottom anchor.

When stranded on beach of river or lakes see shelter fire etc. Stay close to boat if possible.

SEA OTHER PROBLEMS & SOLUTIONS:

Another hardship is the sea's motion. It is very seldom completely calm, at best there will be a gentle swell.

Considering how many people are seasick on the relative calm of a steamer deck, it is not surprising that seasickness often is a direct or indirect cause of death to castaways.

Over half the occupants of lifeboats even hardened sailors go down with it, often in the first hours.

Their bodies are racked by ceaseless attacks of vomiting, till they can spew up nothing but blood and gall and finally lie helpless and exhausted.

No pills will help then, and certainly no solid meal, only rest and getting used to the sea motion which usually takes up to 3 days.

" While swimming after shipwreck toward a raft, the survivors had got rid of their trousers and shoes so as to make better headway. Now once aboard they missed these bitterly.

They were freezing and shivered all over. Every wave soaked them anew. That first night 2 boys died from the effects of exposure." Sea water attacks clothing as well as the skin.

It makes zippers and firearms go rusty, it spoils rations and can act like acid in corroding even canned food.

A survivor had almost all his food cans rusted through, the only ones unaffected were those which had been dipped several times in asphalt before the raft was used.

WATER PROTECTION:

The water takes away the skin's natural moisture. A few hours of dryness and it chaps and begins to swell up. The lips become sore Ointments and protective oils (**coconut is best**) would help if the castaways could get them beforehand.

One man rubbed himself **successfully** with the fat of an albatross he had shot. A bath in the sea is the only thing which can protect a castaway against the scorching rays of the sun.

Yet he would do well to look around first to see if there are no sharks. Clothes soaked in sea water and put on again have also some cooling effect when the water evaporates and a sail may cast a protective shadow.

Where there is no sail, the castaway can only protect every exposed part of the body by clothing regardless of the extra heat this will produce. It is at least better than being roasted alive.

MAKE SURE your clothes are dried up before nights when you wet them, so as not to freeze at night.

MEASURES TO TAKE IMMEDIATELY AFTER CRASHING AT SEA:

Whenever possible, you **MUST** board the life raft directly from the plane. Put your foot in it, don't jump in it. If the raft has capsized, one man **MUST** dive in the water to overturn it.

If it is necessary that all men get in the water before getting in the raft, one man **MUST** get in first then help the others who are wounded to climb aboard.

If there are in the plane **protective suits you MUST absolutely put them on.**

BEFORE CUTTING LOOSE, COUNT YOUR MEN: (WHERE IS DICK???)

Call them to **MAKE SURE** all are present and that all the survival equipment is aboard.

Then cut loose and paddle away before the plane sinks which would create a suction that could bring you down with it.

25 METRES APART:

If you have more than one raft, you **MUST** get them together and tie them together with a rope of about 25 metres apart.

This procedure prevents the rafts to rub against one another and also to jump up from the waves motions which would damage the rafts.

UPON RAFT PROCEDURES:

Then you **MUST** tie up all the equipment **to the raft and one man in each boat MUST** tie himself to this raft.

This measure is to prevent that the raft skips away should the raft capsize for any reasons.

MAKE SURE that the water ballast's are filled up and let go the floating anchor.

The cable **MUST** be adjusted so that the anchor stays down the waves when you are up on its crest #(rester aux creux des lames when raft est sur la crete des vague)#.

If there are any wounded, then you **MUST** do First Aid as quickly as possible. No! You don't drown your travel agent, you keep him as bait for sharks.

UPON STORMY WEATHER:

Or choppy time, install the #tendelet# or if your raft has an automatic #(gonflage) #tendelet#, close the curtains which are located on the sides.

Check if the raft has any damages, fill up the floating devices if you don't find them solid enough, they **MUST** be hard yet not tight and stretched as a tamtam.

Then the raft would be too light and would risk to capsize (10 to 1). It is preferable to let it soft enough to spouse the wave #epouser la vague# .

IF YOU ARE ALONE, YOU ALSO MUST ALWAYS TIE YOURSELF TO THE RAFT IN CASE YOU SHOULD HAPPEN TO FALL OVER BOARD.

If the raft has any damages you MUST repair them immediately with the equipment aboard even using adhesives from your s/kit or your f/Aid kit, yet adhesives work best on dry surfaces.

The sun exposure can provoke an air expansion of your raft, so you **MUST** then let some air off.

At night the cold can make the same air contract so you **MUST** re-inflate it a bit yet not too tight. Both operations have the goal of keeping your raft with a suitable tension to better your life.

KEEP THE RAFT AS DRY AS POSSIBLE:

(To **avoid** chill and foot immersion sea sickness.) As well as a chance to get soft water.

RAFT BALANCE:

To keep the raft in balance, **place all the weight at the centre.** This includes the heaviest persons.

On an inflatable raft, air leak can come from valves, seams or submerged surfaces, these leaks can be repaired quickly (**MUST**) with the appropriate adhesives normally aboard. Chewing gum is often effective to stop leaks.

RAFT SAILING: and below

Upon installing your SAIL, improvised or not,

DON'T EVER ATTACH THE 2 INFERIOR CORNERS AT THE SAME TIME, since a sudden wind blow could make the raft to capsize quickly.

Do this in a way that you can undo one of these corners very quickly should the case arrived. (A shoe lace knot type is good.)

Be ALWAYS careful that your raft don't capsize.

IN A ROUGH SEA, throw the anchor at the bow (front) and lay down.

Don't sit or stand up and refrain of all sudden harsh movements. Keep a second anchor at hand, should you loose the first.

CAPSIZE:

If the raft capsizes, throw the #redressment# rope over the bottom of the raft, go to the other side, and with the help of your foot firmly applied against the #flottaison# tube, grab a hold of the rope and pull strongly and sharply toward you.

If there is no# corde de redressment#, grab the security rope, slide under water and turn the raft downside up.

Most rafts are equipped with #poigne de redressements# . A raft which can contain 20 men does not need any of those since its 2 sides are identical.

To climb aboard a one man raft, climb by the narrow end, while maintaining as much as a horizontal position as possible. Do the same for bigger raft if you are alone.

WATCH KEEPING: (2 hours)

Watch keeping **MUST** be set wherever possible by every able body. **The watchman MUST be replaced every 2 hours.**

He **MUST** be on constant alert for rescue or coast signs. Try to find work to occupy your mind and relax.

If you are many MAKE SURE that every one who is able has something to do. Keeping busy is good for your moral and solitude and you have less time to think of worries and sea sickness.

Empty the raft and dry it up with the utility sponge aboard or improvise one. This way with patience you can dry up completely your raft.

If your clothes are wet, you **MUST** take them off, wring them and put them back on before sponging the raft floor.

PREPARE SIGNALS:

You **MUST** then prepare all your signal instruments and keep them close at hand for immediate use when time comes up.

Use your survival radio at the appointed time, according to instructions. If you have salt-free water kit and water sterilization using solar power use them according to instructions.

CAPTAIN DICK: ?

You **MUST** then decide what measure to take. **A good commander is of the highest importance** and he **MUST** assign task to all members of the crew who are not sick or wounded. Keep them busy boy.

SAILING PRINCIPLE: ON A RAFT:

(see note above as well)

Hoist a sail as big as possible except in case of storm which would break your mast. Its principle is simple it is the wind which moves your raft or boat.

If you want to go west and the wind is East, then you remove the sail and wait for the good wind. If the wind blows North and you want to sail West, you can do it.

All you have to do is to place your sail in a 45 degree angle with the wind and your boat will go West.

In a way a sail boat is like a sail wagon. The wheels inside the tracks prevent the wagon to go astray. The #derives# are the wheels of the raft and the sea is the rail.

To help the raft not to derail in the wrong direction, you use the rudder which you use as a normal steering wheel to correct your way. The #derives# stop the raft to go #en biais#.

MUST AVOID:

A SMALL BOAT MUST AVOID TO PRESENT THE FLANK (SIDES) TO THE WAVES WHICH COULD MAKE IT CAPSIZE.

AUTOMATIC PILOT TO FACE WAVE!:

To make a raft automatically facing the wave, you tie at its back (stern) a floating anchor (like a parachute) so that the waves go into it.

The anchor pushed by the wave pulls on the rope that ties it to the raft & place it well in front of the coming waves.

If the winds and currants push your rafts in the good direction inflate it to its maximum, sit higher.

Bring up the anchor and raise the sail yet see above warning p29 line 5 and on. An oar can be used as a rudder.

IF THE WIND IS AGAINST YOU:

Lower the anchor and lay down. Don't use the sail unless you see the coast.

The currants can cause you much troubles since in mid sea, they move only from 10 to 13 km per day at the most.

Check with a good sailor via extra good tips to write on this so short a subject without going into too deep.

STRICT SURVIVAL KIT:

In case of ship wreck, should you have time, here are the basics items to bring along. Drink as much as you can, your body will keep this precious reserve for a few hours then wrap in any water proof tarp or container to protect them from sea water.

IT IS VITAL TO PROTECT YOURSELF FROM WIND AND KEEP WARM AGAINST EXPOSURES. (A pop tent would be A-1)

A compass, a chrono watch a sextant, if possible a small radio, extra batteries, a fishing kit (lines and hooks), matches waterproof and or a Bic type of lighter, some flares, water signal colorant.

Shark repellent (best = copper acetate), small stove warmer, warm clothing, some first aid kit and medicaments and some food and water, plus this book. Rubber glove, boots and rain gear, a sponge.

RAIN GEAR = A MUST:

One more thing; if you have **a rain gear and boots it MUST come aboard even if it meant to drop some food off.**

OTHER NEEDED ITEMS:

A knife, it does not have to be a big one, but sharp, a Swiss knife with multiple blades and things is best, add also a signal mirror or Heliograph, a whistle & coconut oil if any. I nearly forgot: Sea sick pills are extremely useful and needed.

SIGNAL RADIO:

If you have one bring it and follow the instructions if you don't know see signal file.

THE DISTRESS BAND POSITION IS 121.5 ON VHF.

(KEEP BATTERIES WARM! THEY GO DOWN IN COLD PLACE!)

HOW TO LAND ON DESERT ISLAND:

The sea near the coast is **ALWAYS** different than in mid ocean. **All sailors know that the real and worst dangers are near the coasts.**

The waves at sea don't pull castaways, it is the wind and current which do that job.

But near the coast, it is the waves that will bring you to shore. When a wave approaches a beach, it falls with a **back water movement which is as strong and as dangerous as the wave is big.**

In some Pacific Island, a back water **can be lethal**, even to an embarkation. Place the boat perpendicular to the wave, to do this throw the floating anchor.

HIT THE BEACH LEEWARD:

NOT WIND-WARD BECAUSE OF REEFS.

Try to beach during the day and if possible also, to have the sun behind your back.

BEACH WARNING:

If you reach land on rocky coast, **AVOID AS MUCH AS POSSIBLE** the high grounds and the reefs where the waves hit with their strongest forces.

CHOOSE THE PLACE WHICH SEEMS MOST QUIET.

WAVES WARNING! SEA COAST:

In connection with water, there is 1 special precaution that anyone venturing along a rocky open seacoast MUST heed.

THAT IS TO HOLD FAST AT THE FIRST FEASIBLE SPOT UPON THE APPROACH OF A BIG WAVE.

Deliberately choosing to get wet rather than taking the chance of running across uncertain footing and thus risking in many exposed area **the very real peril of being injured and even of being swept away and drowned.**

SWIMMING TO LAND & WARNING:

If you are in the sea and swimming toward the shore where there are giant waves;

YOU MUST AVOID TO BE CARRIED BY AN UNDERTOW WAVE which would pull you down and drown you, since you can not go back to the surface fast enough to take a breath of air.

To **avoid** this danger, if you are swimming toward the coast and that you approach the falling shore waves, turn around and face the waves.

Dive in head first, you will cross it trough and trough without any problems, then start right away to swim toward the shore, till the next wave which you **MUST** face once more as previously done till you reach shore. (Dive and swim again!)

IF YOU ARE TAKEN OVER BY A CURRENT, DON'T FIGHT IT!

If it is a coastal current it will bring you to shore without fail.

Try to approach the land by letting yourself carried by the waves having your legs folded under you.

Relax so as to better absorb the shocks. If you have kept your shoes, it will be best especially if you happen to have to cross reefs and corrals.

The best way to rest at sea is to do the #plank# or to swim on your side to save your strength. **ALWAYS** swim with the wind at your back.

If you get cramp, don't panic, don't try to move that muscle, try to rest and if possible give a massage to that muscle.

ONCE UPON SHORE:

Once upon the shore of this Robinson island you will find on the beach, crabs, seashells lobsters, shrimps, sea weed, etc.

AT LOW TIDE by turning stones you will find many a mollusc that are ALL GOOD TO EAT.

As for soft water we told you already how to find it. So, dig behind the dune, not too deep, for soft water floats above sea water.

If you decide to move around, follow the littoral rather than the interior roads.

Unless you know the area, **DON'T EVER LEAVE THE SHORE** except to **avoid** obstacles such as swamps and cliffs.

SEA FOOD SUPPLEMENTS & TIPS:

ALL SEA BIRDS ARE COMESTIBLES EITHER RAW OR COOKED.

You can catch them by bating a hook and letting it float near the raft or when then come perching on the raft.

FISHING:

Use the ordinary means, which is to agitate your bait in the water or to practice the throw and bring the line slowly back.

Don't attach your fish line to your raft, nor should you fish with your bare hands, the line can cut you severely, **cover your hands**.

SEA PRINCIPAL DANGERS:

SHARKS: (Best repellent = copper acetate.)

Easy to recognize by their fins and tail slicing the wave's surface (JAWS).

They are attracted by bright colours, by blood, vomits, excrement's, & garbages & trashes. (Your lousy travel agent?) check rpt previous

SO LET ALWAYS YOUR HANDS AND FEET IN THE RAFT.

Throw your garbages etc. only at night and in small quantities as far as possible from the raft. Usually the sharks approach only by curiosity.

Unless attracted by food smelling in which case their hunger can make them real **dangerous**. (Worst than Income tax boys?). Stay immobile aboard the raft, there are fewer risks of attack.

SHARK AS FOOD YES:

Cured, dry or cooked the sharks flesh is **ALWAYS NOURISHING** & is found in many fishes stores across the world.

Yet **DON'T EAT** the liver in great quantity for it is too rich in Vitamin A.

ITS FLESH SPOILS REAL FAST, THUS YOU MUST BLEED IT IMMEDIATELY.

MEASURES TO TAKE AGAINST SHARKS IN WATER:

- 1) Keep your clothes and shoes on Perron!
- 2) When shark menace many persons, those **MUST** make a closed circle facing outside, which permits you to see it everywhere, if the sea is rough tie yourselves together.
- 3) Stay as calm as possible, save your energy, let yourself float so as not to expose all your body, **avoid** any sharp movements.
- 4) Get away from fishes schools #banc de poissons#. When a shark makes big circle, he is only curious.

If the circles get smaller and that he becomes agitated, he is ready to attack. If there is only one shark threatening you at short distance;

- 5) Swim regularly & firmly, slightly toward him to scare him.
- 6) Don't turn your back to him, don't go away from his attacking field, face him and swim strongly on one side or the other.
- 7) Hit strongly and regularly the water surface with your hands. Dive and shout and yell loudly and piercing, these methods can work to scare him off.
- 8) Upon attacking if you have a knife, aim for the nose, eyes, gills or the stomach.

UPON A RAFT VIA SHARKS:

- 1) Don't fish when sharks are circling you, when you see a shark, better leave the fish you just caught. **DON'T** empty fishes at the water surface.
- 2) Don't throw your garbages at sea when sharks are near by.
- 3) Don't let your hands nor feet laying near the raft, specially when you are fishing, they will jump on those bright colours.
- 4) If a shark threaten to attack or damage the raft, hit him on the nose or gills with your oar.
- 5) If you **MUST** go in the water; **MAKE SURE** that there is no shark either under or around the raft.

BARRACUDAS:

It looks like a #brochet# it is an aggressive fish and if you see him, take the same measures as for the sharks.

One MUST also learn that Barracuda are not ALWAYS as aggressive as said.

Their ferocious appearance and strange nature spread terror among us, although their attack on men is restricted.

The Australian Barracudas are reported to be **much more dangerous** than the Caribbean's or the Pacific Island types.

As a dog or wolf pack, the barracudas are more **dangerous** if in pack than isolated. Many species colour themselves of vertical line on their back prior to their attack.

It can happen that a Barracuda gulps in one bite the fish you have just caught, let the S.O.B. have it.

In murky or dark water, they will pounce on brilliant objects, thinking it to be a fish.

So at night they will charge on any lighted sources whatever it may be. Unless very special reasons the Barracuda will not attack you. Don't be unnecessarily afraid nor concerned of his manoeuvres and twisting around. (Show off!)

SWORD FISH: (En garde?)

Easy to recognize because of his nose in form of a sword normally not dangerous except if he is attacked or wounded.

#EPAULARDS#:

They usually travel in group, recognise by the triangular shape of their fins slicing the sea when they swim as #marsouins#, they have a black back.

They will not bother you but could capsize a boat which happens to be on their path. **(Keep away!)**

#MURENES, RAIES#:

Those species are found normally along the coral reefs of the Tropics or near the coasts.

You MUST ALWAYS protect your hands & foot when walking in the coastal water.

The Giant #raie# or Manta in the Tropics **MUST** not be ???

While swimming the #raie# uplift the 2 ends of her #nageoires# which if seen above water can make you believe that 2 sharks are swimming side by side.

If the 2 #nageoires# disappear simultaneously and periodically it is a #raie#.

At great depth they are not dangerous to the swimmer, but some can become **dangerous** in shallow water, especially if you step on them.

POISONOUS FISHES:

Many castaways are frightened by unfamiliar big fish or mammals. They refrain from any attempt at fishing thereby losing the chances of catching smaller fishes.

Sure there are poisonous fishes but unless you are a specialist, you can't tell which witch is which.

YET MANY OF THESE FISHES CARRY THEIR POISON ONLY IN THE INTERNAL ORGANS: THE GUT & ABOVE ALL THE #ROE# .

ALL EDIBLE:

There is a comfort for castaways, **ALL FISHES FOUND IN THE OPEN SEA ARE EDIBLE & ALL POISONOUS FISHES LIVE NEAR ISLAND & IN TROPICAL LAGOONS.**

The ONLY exception is the mackerel like oil fish and inhabiting the open sea as well a depth of 200 fathom.

BASIC ID FOR POISONOUS FISHES:

Survival experts try to give a few basic rules on the subject of poisonous fish which generally look very ugly, with deep set eyes.

A small mouth like a parrot's beak, slimy gills, a ball or box shaped body, hard scales, dangerous looking prickles or loose whitish skin.

Their ventral fins are stunted or completely missing. Their flesh often has a repulsive odour and if you press on it, the dent remains for some time as it does if you press on the legs suffering from leprosy or dropsy.

Avoid also the fish with bright colours, those covered of sharp pricks, those who bloat, those who have near human teeth. Don't eat fish eggs coming in cluster or grape.

SEA DANGERS & EXPOSURE:

So the castaway at sea is beset with dangers of all kinds. Surrounded by water he may die of thirst and he may starve drifting over the world's greatest larder. He may be killed or horribly mangled by sharks, often within sight of land and safety.

Yet all these dangers, however commonly they occur are of secondary importance compared **with the danger of death from EXPOSURE.**

Exposure to wind & waves, heat, cold and damp & all their attendant physical stresses when people are afloat in small craft tossing on the ocean.

A castaway's power of resistance is weakened anyhow by fear, nerve-strain and his struggles at the time of the actual ship-wrecking or ditching. Those powers are still reduced still more and still more rapidly by exposure.

Many castaways have fallen over board of their life boat or raft and were then too weak to swim back & climb on again.

Often they were in a strong current which carried the craft away from them too fast to catch up. (So tie yourself to the raft at sea with your **BOZO LINE!**)

SAFETY ROPE!: (BOZO LINE)

A survivor "Willies" describes how meeting a shark, he fell off his raft while fishing and was soon 16 yards astern of it. He knew that however hard he swam he would never catch up.

Luckily he found the fishing line wrapped around his arm. Its other hand was tied up to the raft. Hand over hand he pulled himself along the line to the raft and at last made it with great difficulty.

He remembered how in New York he had promised his wife **"to keep a rope or 2 trailing from the raft at all time.**

If I had it would have been easy matter to pull myself in on a line especially with knots every foot or so, but I just never got around to doing it. (I call it BOZO line! WHY? Because you are a real Bozo if you don't!)

OFTEN THE DANGER EXIST IN THE IMAGINATION OF MEN ONLY!

TOXIC FISHES & NOT COMESTIBLES #2:

Tropical waters are **full of all kinds of toxic fishes.** However most of them have many common characteristics:

- 1) Strange shape square or round.
- 2) Hard and tough skin often with thorns or pricks.
- 3) A very small mouth (minuscule).
- 4) Small #nageoires# or even without them.
- 5) They also have strange names very descriptive as well. Ex; #Vache Marine (coffre)# has like the cow a rigid and bony back as well as 2 horns like above the eyes.

SOME ID OF THEM:

#Le poisson lime# has a very rough skin and its striped spine# avance en saillie# over its head.

The #blectognathe and the herisson de mer, & the poisson de lune# **MUST NEVER BE EATEN**, they are easy to recognise.

The first two will swell up as soon as you approach them & the third carries an immense head without body nor tail.

Many species of fishes will give a slimy liquid from their under-skin gland.

This foam is **TOXIC and not comestible**, it will affect your eyes and skin, so **KEEP OFF**. Among those are:

MORE TOXIC FISHES:

The Soap fish, Toad Fish, #Gastrobranchie, Murene and the vache marine.#

If you ever eat those fishes **you MUST ALWAYS** remove the skin. Also for many reasons, the liver, glands, intestines, brain & all inner organs of these fishes can be **TOXIC**.

WARNING! (DON'T EAT THOSE PARTS!)

COOKING THEM WILL NOT, NOT EVER REMOVE THE TOXIN POISON:

You **MUST carefully** empty and clean all the fishes that are not familiar to you before eating them so as not to contaminate the comestibles flesh.

Unless you happen to know that a specie is not toxic to eat and that in all seasons.

You MUST not believe that just cooking a toxic fish will render it comestible. Even in stew or soup.

The TOXIC POISON OF THOSE FISHES REMAINS EXTREMELY DANGEROUS.

#LE CIGUATERA#:

It is said that this toxin comes from the bleu- greenish #algues# growing at the base of tropical island reefs.

Thus it is normal to assume that the fishes which feed on them (most especially in the Indo-Pacific and Caribbean's Islands) **can become toxic**. Those are characterized by mouth in a parrot shape.

When you fish in those waters;

ALWAYS CHECK THE FISHES BEFORE EATING THEM. THE PREDATORS EATING THOSE FISHES ARE EVEN MORE TOXIC THAN THE FIRST.

Thus the Barracudas (1 metre & longer) #les brochetons et les perches# are major causes for the ciguatera#.

TASTING TEST:

So you **MUST** not eat them without taking all possible precautions. The only positive test consists in feeding a #mammifere# or to eat a very small quantity.

WE REPEAT THE COOKING CAN NOT DESTROY THE TOXIN.

If and when possible do as the natives around as to which fish is or not comestibles. Yet don't forget that the region natives at times will not eat of a specie because of tradition or because of superstition. Yet not respecting either could cause grievous trouble. (Better off!)

FISH WHICH STINGS: (NOT SINGS)

Many species of fishes are armed with pricks capable to inflict deep wounds. Some of them those barbs are attached with **VENOMOUS glands**.

AVOID THOSE. DON'T EVEN TOUCH THEM. SPECIALLY THE STONE-FISH & ZEBRA FISH.

Even if the toxin varies between species & individuals of the same species, the following group is considered as **dangerous**. (Cousin of your ex? maybe?)

#The MEDUSAS#:

The Medusas including the (Portuguese man of war) are characterize by their ability to whip and burn the skin. Their #tentacles# are to fear.

Yet your clothing will protect you fairly well of their stings. Even if their stings are not considered dangerous (that is lethal weapon), they stay excessively painful and will perturb the organism good functioning. **(Stay clear!)**

SEA SNAKES = WORST!:

Keep clear of snakes in the water. Found on shore, pin them with a forked stick- they **make a good meal**. Found only in the Pacific and Indian ocean.

THEIR BITES ARE EXTREMELY TOXIC, 10 TIMES WORST THAN ANY OTHER LAND SNAKES.

There is a great variety of colours among the many species. But they are recognize by their scaled body and their tail which is flat and vertical.

Generally they don't attack swimmers, yet some species are more aggressive than others specially during mating season.

Their fangs are very short, thus they can not bite easily this is why their bites are NOT ALWAYS serious.

At night, the light attracts them, often fishermen are the first victim having been too careless when they clean their nets.

Sometime they come to take a breath of fresh air and in the spring some species will gather together covering many Km. in length of their snaky movements. Beurk!

Usually their bites cause very little pain and at times no local pains. Paralysis will occur as first symptom only after a few hours later. Death will occur only after a week or more after their bite. Death mortality about 17 %.

REMEDY:

Same f/aid as normal snake bites except that it is not advised to open the wound, since the garrotte application & the immediate immobilisation of the victim are much more efficient means than to try to suck the venom off the wound.

They are comestibles but you have to remove the head which contains the venom, then cook it as any other fish.

#LES RAIES PIQUANTES#

Those fishes are armed with prickly barbs & **VENOMOUS** as well, located near the tail end.

When the barbs break inside a wound they are very difficult to remove and the **risk of infection is very great**.

Those fishes in flat shape measure often some metres long and resemble to the #raie geante.# They are found in the shallow and warm water near the coast.

To approach them, walk with caution in water, and take care to have a staff to open you a way. As soon as the #raie# feels touch she flies like an arrow.

If you ever walk on one, then she shakes vigorously her tail and she stings you to the legs and ankles. This is why the good **precaution** of using a staff as blind guide.

OTHER POISONOUS FISHES:

#Poisson-chat, le trachinus, le surgeon-fish, le stone-fish, poisson zebra, poisson scorpion#

Among the following only the #Vive and Racasse# will make you truly sick, but stay away from the others anyway. #Anemone des mers, le chabot, diable ou cotte ou scorpion de mer lives also in soft water#

#Le dragonet# multicolour or Capousi lives in sand bars in shallow water. #la racasse# full of barbs is found in the Mediterranean.

La Vive# lives in all European coast. Protect yourself when wandering in shallow water, and if the bottom is invisible, walk dragging your feet & with a staff.

FISH THAT STINGS TIP 2:

Whenever one of those fishes stings you, clean and **empty the wound immediately.**

Place the affected part in hot water (50C. and more) or cover it with hot compress during 30-60 minutes, so as to destroy the toxin effect.

There are very few antidotes to them. Some doctors say **NEVER** use water to clean the wound of those stings but to disinfect them with alcohol at 90 degrees and rub the sting with dry sand and while waiting for the doctor to bath the wound in cold salted water? Who is right?

FISH THAT BYTE: (Yet never bark!)

At sea the risks to be bitten by a fish are much less than the possibility of being light-stricken.

But there are 3 fishes which causes terrors because of the ugly wound they inflict.

There are the Barracuda and sharks (see above) and #Murene# p36 line 18 this file?

If all Eels can bite when they are provoked, the #murene# has the reputation, well deserved, **TO BE THE MOST AGGRESSIVE & DANGEROUS TO MAN.**

These Eels live in holes and #crevasses# of tropical reefs and defend their nest against all feet or arms which appear as a threat.

So when you search the #crevasses# looking for fishes or lobsters, be on your guard and **BEWARE of #murenes#.**

When they bite, it often happens that their crooked teeth go so deep in the flesh, that they can not let go, you **MUST** then cut the head off. Not yours dummy, theirs!). They often cause haemorrhage!

OTHER DANGERS FROM THE SEA:

Even though we have given you a small list of **dangerous and toxic fishes** there are numerous other dangers. The Boneshell and the long and thin snail Tereba are **equally dangerous.**

Avoid the Electrical EEL (torpedo fish) which abounds in the Arcachon basin, they will give you an electrical 220 volts & could kill you. Threat the patient as for electrical shock: see f/aidp? File? (Watt was that?)

DON'T grab with bare hands the #haliotis and palourdes# For they will grab your fingers as well and will not let go. **Beware also of the big #conques#. Avoid them!**

CORALS:

Either dead or alive can inflict painful wounds and cuts. Just to reassure you, there are hundreds of sea creatures capable to wound you grievously.

CROCODILES:

They live in the salted water of the tropical #baies# and in the estuaries boarded of #mangles# .

They can venture up to 65 Km at high sea. Some live where there are people, but most live in the remotest regions of the Neerlandish Indies and of the south-east Asia.

The species the most **dangerous** are those of 2 metres long; most especially the female keeping the nest. The **crocodile flesh is VERY NOURISHING!**

#OURSINS, BISCUITS DE MER, EPONGES ET LES ACTINIES# :

If the #oursins# and their cousins don't inflict deadly wound yet their wound **can be Very painful.**

The #oursins# live in shallow water, near corral reefs. Seeing them they look like small ballooned porcupine.

When you walk upon them, they will drive in your flesh their fine needles which will break & will cause infection. **Those needles, or thorns MUST be removed and the wound disinfected.**

There are many species of #oursin des mers# but the **most dangerous** one are the one with long needles #diademia#. Their fine secondary needles are more dangerous than their primary ones which are much thicker.

In fact it is practically impossible to remove all those needles. So if the wound does not heal, try to remove all the needles that you can.

If the others don't dissolve in the body and that the wound gets infected you need a surgical operation.

Apparently a solution of ammonia, of alcohol or vegetable juice applied on the wound activates their dissolution.

Most short needles #oursin# can be gathered with bare hands or with rubber gloves, & their #gonades# when **ripe can be eaten Raw** or cooked and constitute a very**refined meal.**

The N.W USA exports a great number of them toward the far East, their eggs are greatly appreciated. **While spawning many species are NOT comestibles.**

SEA STAR:

Not comestibles and at times could be dangerous by their toxin.

F/AID:

Chk via antiseptic made of charbon de bois since it attracts much poison also via toxin of fish even infection also the role of clay dressing via burns, cut.

FOOD AT SEA, TO EAT OR NOT?:

The quantity of food that one can eat in survival at sea is **directly proportional** to the volume of soft water one has.

The body needs water to digest as well as for its removal. First if you don't have water don't eat is the best to do, until you get some water from rain or otherwise. Feeding is not so important by itself that you have to worry about not eating for a few days.

The body keeps on functioning many days without food for it can take it from the body fat reserve. (Good time to start diet plan dear!)

FOOD CATEGORIES:

1) #Hydrate de carbon# as found in survival kit for instance have the smallest need of water to be digested.

So if you have those and as long as you have some water you can eat as indicated on the boxes. Here are some more ex. of them:

2) **Protein**; found in fish, shells, meat, eggs and green vegetables.

The digestion of those needs a lot of water, this is why you should not eat them unless you have a great reserve of water.

FOOD RULES:

1) If you have ample water supply, eat first the protein type of food and keep the #hydrate de carbon# for when water diminishes.

2) Fish will be your greatest source of protein, yet don't believe that the fish juice will replace the soft water for this juice also contains proteins which will require more water to be digested.

Sea birds also contain protein. The #algas# eaten raw or cooked also require an added water supply to be digested.

3) **REMEMBER** that your water supply will determine the amount of food if any that you can eat.

4) If you are sea-sick don't eat! It would only get worst!

SIGHTING THE LAND:

It is generally accepted the idea that you **MUST** put the floating anchor so as to say as close to the ship wreck or plane crash in the event that it would help a possible rescue party to localise you. But it may happen that you decide to try to reach the coast.

Sailing on a raft one can diverge about 10 degrees from the wind direction, but your road will mainly depend upon the sea currants & of the wind.

To use the sea currants in your navigation, make all members of the raft sit down and let your raft deflate a bit so as to soften it up a bit and drop your floating anchor.

To use the winds when blowing in the right direction

pump up a bit the raft so as to rise up a bit the floatation line.

Make all members to sit down, remove the floating anchor from the sea. Empty the #sacs de lest# , use any things to make a sail.

HOW TO RECOGNIZE THE CLOSENESS OF THE LAND:

Its proximity by certain indications:

1) The cumulus that are seen afar in bright day usually form themselves over the land.

2) The birds fly often the sea in the morning and return toward the land at night. (Bar is open boys!)

3) The wind blows generally toward the land during the day and toward the sea at night.

4) Under the tropics the coral reefs or lagoons often reflect themselves in the clouds. This reflection takes a greenish colour.

5) Deep water is dark green or dark blue, clearer water indicates high #haut fonds# and can be a sign of land proximity.

6) Floating vegetation or dead wood at the water surface often indicates that the land is near by.

7) Don't confound mirage with land, but if you lower or heighten your sight the mirage will disappear or will change forms.

- 8) The littoral odour is also very **important** when coming in at night or in fog time.
- 9) Clouds are still the best bet to tell land is near. The small clouds gather themselves over the corals islands & reefs still hidden.
- 10) Presence of lightning in a particular region of the sky at dawn & early morning hours indicate a mountainous region specially in the tropics.
- 11) In the POLAR zone a luminous spot cutting in a grey sky can indicate an iceberg.

BEACHING LANDING DANGER:

Many a castaway in a rubber boat have drowned in the surf or received severe coral cuts by landing on the windward side of an island.

So pull toward the calmer lee shore on the lagoon side of an island as much as possible.

If you navigate or drift toward the shore, you **MUST** observe certain precautions.

- 1) PUT ON your life jacket & **MAKE SURE** its fully inflated.
- 2) Put on all your clothes and also your shoes.
- 3) Choose the most proper place to beach and try to navigate in that direction.

3B) HIT THE BEACH LEEWARD NOT WINDWARD BECAUSE OF THE REEFS.

Hit during the day & with sun behind your back.

REMEMBER that many a castaway drowned in the surf or received severe coral cuts **by landing on the windward side of an island.**

So try your utmost best to pull toward the calmer lee shore on the lagoon side of your inlet.

- 4) Let your floating anchor float with as much rope as possible so as to slow down your beach approach.
- 5) Try to maintain your raft away from the great waves.
- 6) Stay aboard the raft till the moment you will crash on the beach and once the raft has touched the beach, get off quickly & pull it off the sea on dry land.
- 7) Carry you raft far enough inland so as not to loose it because of high tide, you may need it later to fish or for shelter.

MAKING A LANDFALL:

When you approach land try to select a landing point where it will be easy to beach or where you can safely swim ashore. Take down the sail and keep watch for rocks.

The sea anchor will keep you pointing at the shore and will slow down your progress, giving you more time to steer away if you are heading for rocks.

Try not to land with the sun into your eyes, which will make it more difficult for you to see the rocks and difficulties.

A sloping beach with a small surf is the ideal place to choose-if you have any choice. If you can time it right, ride the back of a breaker.

To **avoid** being swamped or turned sideways by an oncoming crest of a wave paddle hard, but do not overshoot a breaker which is carrying you along.

In Very heavy surf turn the vessel to face seaward and as a wave approaches, paddle into it.

REMEMBER the 7th wave is the strongest in or out.

As you approach note the lie of the land: the location of high ground, types of vegetation, possible watercourses. You will see features which may be invisible from the shore.

If with companions, choose a rendezvous spot to meet at if the boat breaks up & you are separated. (Nearest Mc Donald or Hilton or bar?)

If you reach land at night wait until morning to beach if you can, there are too many dangers you can fail to spot in the dark.

If you float into an estuary make every effort to reach bank. The turning tide could carry you back out to sea. Take in the sea anchor and to gain ground, make the boat as light as possible.

Bail out an inflatable and inflate it to the maximum. This enables you to make the most of the incoming tide.

If you are swept back out to sea by the ebb: Ballast the dinghy by part filling it with water and stream the sea anchor.

NOTE:

Keep yourself tied to your raft. Even if it is overturned or damaged & you are rendered unconscious, you stand a chance of surviving. Alone in the water & dashed on the rocks- you are DEAD. (Oops)

SHIPWRECK SPECIAL NEEDS:

We **MUST** stress once more that the exterior #ambience# has a great influence upon the castaway resistance in 3 points;

1) When a man stays immersed in water, he is virtually condemn to death even under the Tropics because of the considerable body heat loss.

His body is unable to compensate such a loss by itself. What is a matter of hours in warm regions is a matter of minutes in cold climates. The heat loss is 25 times greater in the water than in the air.

2) You **MUST** be protected against the sun in hot climate and against cold in all latitudes. Thus the necessity to isolate yourself from direct sea water contact.

3) **IT'S VITAL TO BE PROTECTED FROM THE WIND.**

(Bombard had a small tent aboard his raft that saved his life.)

CRASH AT SEA AND OIL SLICK:

If after the crash, your plane takes fire and that the oil spreads all around, flee quickly either by swimming or by rowing vigorously against the wind.

If swimming, dive and swim under the thinnest burning oil slick. Do the same when facing a thick wall of fire.

To retake your breath: come to the surface hands first and agitate strongly your arms then breath and dive once more, keep on till you are out of the danger BBQ zone

HOW TO SWIM TO SURVIVE:

A life jacket not too much inflated will get you farther if you swim on you back.

If you know how to relax in water, you can without difficulties maintain yourselves at the water level without this equipment, especially in salted water.

The air kept captive inside your clothes can help you to float and will permit you to rest. Button up your shirt and blow inside the third button, the air will come at the back of your wet shirt and will make a sort of life jacket.

Take off your pants, tie the legs at the bottom, zipped up and put them behind you, then bring them forward, the legs will fill with air and will keep you afloat for a while.

If this does not work the first time, try it again, it will work. When the air is all out then you redo it again.

BACK FLOATING METHOD:

Adopt the back floating method as often as possible to rest. If the sea is too rough do this;

- 1) Relax and place yourself in a vertical position & breath deeply.
- 2) Dive your head forward under the water, then go forward by making a few brass movement.
- 3) Keep this position till need to breath again.
- 4) Bring back you head up, exhale, maintain yourselves by agitating slightly your hands and feet, breath and start the same cycle.

SWIMMING A SHORE:

If you have to swim ashore on to rocks in a heavy sea keep on clothing, shoes & life-jackets if you have it.

Raise your legs in front of you to take the shock of impact with rocks on the soles of your feet; absorb it in bending the knees.

SWIMMING & SHORE LANDING:

If within sight of land **don't battle against the ebb**, relax and float until it turns and helps to carry you to land

If the sea is too rough to float on your back adopt this technique.

- 1) Float upright in the water & take a deep breath.
- 2) Lower your face into the water, keeping your mouth closed & bring your arms forward to rest at water level.
- 3) Relax in this position until you need to take in more air.
- 4) Raise your head above the surface, treading water and exhale. Take another breath and return to the relaxed position.

SEA SICKNESS & REMEDY:

"IMMERSION FOOT" :

A sea malady similar to frostbite caused by continued exposure to cold salt water, rescuers **MUST NOT** rub nor apply direct heat to the feet & **MUST AVOID** to BREAK THE SKIN (see f/aid on this.)

Sickness like a type of frostbite, caught aboard a raft from cold and damp sea water to long exposure, also cramps and bad circulation will be together to cause it.

Symptoms; pricking, redness, numbness are the first to come. A skin light pinkish and blisters will come afterward in 2nd.

REMEDY:

When you suffer from it, keep your feet dry and warm, wiggle them and loosen your shoes so as to maintain a good blood flow in them. Rise up your legs for 30 min. many times a day. When you reach coast, don't walk but rest till all normal.

BURNS AND #FURUNCLES# (PIMPLES?BOILS) FROM SEA WATER:

Troubles caused by constant sea water contact, **don't prick nor pinch those BOILS**. (Infection spreading danger.)

SEA SICKNESS:

Don't drink nor eat. Take sea sick pills change frequently the position of your head. After 3 days you get over it.

SEA BLINDNESS:

Caused by light reverberation, wear sunglasses or improvise them from a slit in a cloth. If no medicament place on the eyes a cloth soaked with salted water.

CONSTIPATION:

A board a raft it is normal, some have gone from 1 week to 39 days without poo-poo, shit, oh well! Don't worry, it won't be a bother. Don't absorb laxatives, do as much exercises as possible.

DIFFICULTY TO URINATE OR DARKEN URINE:

Normal problem in those circumstances.

SEA WATER via SOFT WATER:

By great cold, one can convert sea water in soft water by gathering sea water in a container and letting it freeze.

As the sea water freezes up, the salt concentrates at the heart of the ice, now you just have to separate those 2 elements to have soft water.

FISH EATING CAUTION at SEA:

We repeat that practically all fishes are comestibles.

BUT in tropical regions, you MUST empty and bleed them IMMEDIATELY after having caught them for they spoil within a few minutes otherwise.

What is not consumed immediately will cut in thin slices, salted and put to dry, this will it will keep for a few days.

TOXIC FISH:

DON'T EVER EAT FISH WITH SHINNING GILLS, those which have deep set eyes of which flesh is soft & smells bad. Yet we know that those fishes are rarely found at high sea.

Sea fish **MUST** smell fresh and salty. In case of doubt, use it as a bait or throw it over board but **MAKE SURE** there are no sharks lurking by.

You may eat the heart, the liver but cook the intestines of any fishes, and with the pollution we would add not to eat the liver of either fish, fowl or beast.

At high sea, the food intoxication is due to the improper manipulation of fishes and to its spoiling; rather than all other causes since fishes is particularly susceptible to the spoiling due to the bacteria.

WARNING:

3 DAYS OLD FISHES IS GOOD AS A BAIT ONLY. IN TROPICS FISH SPOILS IN 1/2 HOUR.

SEA FISHING, The HOOK:

Take a piece of wood which you have dug 3 notches, the strongest one acts as a support. Let this hook drag at the back of the raft in a 45 degree angle.

At the same time you could also catch some small fishes and some crabs which may entangle themselves in the seaweed.

So you can feed yourselves from the SEA WEEDS as well as of those small fishes which also could be used as bait.

SEAWEED = DELICIOUS:

The SEAWEED constitutes an excellent source of vitamins and mineral salts but the SARGASSE which is brown, salted and hard and difficult to digest grows at high sea.

Yet she requires a lot of body liquid to be digested so don't eat it unless you have a lot of soft water as supply.

The green, brown and red seaweeds contain up to 25% of proteins 50% of carbon hydrate and are rich with iodine and Vitamin C.

Choose those which are attached to rocks or which floats around. But not those laying on the beach which may be contaminated and are slowly spoiling.

Dried over a fire or by the sun, the seaweed thin and tender becomes crusty and delicious.

As for the thick and tough their first **MUST** be washed and boiled. They go well with seafood as an added nutritive supplement.

SEA LETTUCE: (Ulva)

It grows just under the low tide line along Pacific northern coast and of the Atlantic. Eat as any normal lettuce. (With Caesar salad?)

#VARECH SUCRER#:

Brown seaweed grows both sides of the Atlantic, China Coast, Japan. **Good to eat as well.** Boil it before eating.

#VARECH#:

Long brown or olive green seaweed living at high sea and deep in water. At time it can grow up to 3 1/2 metre in one week. **Boil it before eating** it with vegetable or in soup.

IRISH PEARL MOSS:

This moss grows both sides of the Atlantic, looking like stunted and tough lettuce. **MUST be boiled before eating.**

#Le DULSE#:

Red seaweed, hang short stems and wide and thin leaves in fan-shape which most of them are crackled and its boarders are coated with strange lobes.

Found in Atlantic and Mediterranean these sweet plants **can be eaten fresh or dried up.**

#LE LAVER#: (Porphyria)

This satin plant can be red, deep purple or purple brown. Add them to cereal grains or make delicious pancake. It grows under the high tide line.

#SPARTINA#:

Found on both sides of the Northern Atlantic. In the Fall she produces a comestibles grain.

#L'HORTENSIA DE MER#:

This plant grows on the Mediterranean coast. Its small grey leaves measure about 2 1/2 cm are comestibles. In spring this plant crowns itself of thin flowers which points up at the ends of its branches.

#PAIN DES ST. JEAN#:

This tree up to 15 metres grows in the Arid zone belting the Mediterranean as well as Iran, Sahara, Arabia, & India.

Its leaves are persisting with little red flowers which kernels supply a comestible pulp. Grind the seeds and cook them as gruel.

BAITS:

Any shining pieces, etc. can be used as a bait before you get your first fishes which you use in parts as bating.

FISHING TIPS:

- 1) Manipulate **carefully** thorny & prickly fishes.
 - 2) Don't attach your fish line to anything rigid, for a big fish will easily break it.
 - 3) Don't attach your fish line around your body. **NEVER.**
 - 4) Better to free a big fish than to capsize your raft.
 - 5) Be **EXTRA CAREFUL** not to puncture your raft with a hook etc. (OOPS!)
 - 6) Don't ever fish when there are sharks around.
 - 7) If possible get close to fish banks. #bancs de fish#
 - 8) Light from your flashlight or reflected moon light from your mirror or white cloth dashed upon the sea surface at night will attract many a fish. **Beware of Barracuda.**
 - 9) During the day fishes love to gather under the shadow of a sail or tarpaulin.
 - 10) The flesh of all fishes captured at high sea is comestibles except for MEDUSA and the liver of some species (sharks) are **comestibles Raw or cooked.**
- Raw fish is not salted and has a good taste. (Sushi)** Clean and gut them immediately in hot regions. (Spoils in 1/2 hour in TROPICS)
- 11) A knife attached to a oar is an excellent harpoon to catch the big fishes.
Draw it quickly inside the raft, for the fish could while fighting to free itself also break or loosen your blade and you would loose your weapon.
 - 12) If you loose your fishing equipment, agitate the fish or birds intestines under the water. A survivor tells that this way, he caught 80 fishes in one day alone. (No fishing jokes!)
 - 13) Take good care of your fishing equipment. Let your lines to dry up.

Clean and sharpen your hooks and don't let them entangle themselves with the lines, and keep away from raft.

SEA BIRDS ALL ARE COMESTIBLES:

All are comestibles, they will land on your raft even upon the survivors shoulders. When the birds seem scared, let float at the sea surface a baited hook or throw it into the air.

Of course there are many more sea birds in southern water than in the northern part, yet be patient, bird will come.

Many sea birds are attracted at shooting range by brilliant metallic objects or by a shell which you let drag behind the raft.

You can also snare them, by putting a bait inside a rope which has a slipping knot, when the birds jump on the snared bait, pull fast on the string which will catch it by the feet.

All the parts of the birds are useful, even the feathers can be used as isolation in your shoes and clothes even for baits.

FLOATING & FISHING ANCHOR:

Most rescue rafts have floating anchor aboard, if not, use a pail, a shirt or any object which can serve that goal.

The anchor serves as a sort of dead weight to help maintain and hold on an embarkation most especially when one wants to stay close to the ship wreck.

In case of a storm, the floating anchor is used to keep the raft in the good direction facing the wind.

DON'T EVER LET THE ANCHOR'S ROPE TO RUB AGAINST THE RAFT.

Wrap a cloth around the rope's part which would come in raft's contact. A shirt is used as substitute preferably to a big tarp because it is more permeable and more capable to better retain the plankton and the small fishes.

The floating anchor will gather a remarkable quantity of plankton which is comestibles and cures scurvy as well.

TASTE TESTING VIA EDIBLE OR NOT?:

- 1) Taste a small portion of sea food, if it taste funny, harsh, bitter, stings the mouth or bad taste spit it out fast.
- 2) If the taste seems acceptable, swallow a small portion and wait for one hour.
- 3) If there is no physical reaction forthcoming, it is likely that this food is relatively edible, since **most toxins reveal Very quickly any bad symptoms.** (What do you mean the cook is dead?)

DON'T EVER EAT ANY FOOD WHICH APPEAR PUTRID, ROTTEN OR SPOILED.

- 4) When no symptoms has appeared within the following 12 hours then it is certain that the flesh is comestibles.

#MOLLUSC#:

#Moules, palourdes, patelles, escargots de mer are all comestibles.# Some exceptions: #pieuvres a cernes bleu# of south-west Pacific reefs which **bite can be deadly.**

The "Red tide" can intoxicate certain #mollusc# at times, so even though they are rich in protein.

It is better to check the combustibility before eating them in great quantity. Sea pollution has not made it any better nor safer helas.

WARNING:

When you gather conical shape seashells, keep the sharp point away from you and don't gather a bunch of live sea shells upon your skin.

Among the 400 species found in Pacific and Indian oceans only **15 are toxic but their stings are deadly.**

AVOID all conical shells with a coloured texture and with a red horn or trunk like shape. Safer is better, unless you absolutely know for sure. Yet the risk is not worth the trial.

WORMS:

Although comestibles, it is better to use them as bait than to eat them. Especially to **AVOID** the worms which are hairy looking like caterpillar and the tubular worm with cutting forms.

ARTHROPODS:

That specie includes the crabs, (400 kinds) lobsters, #barnacles# and some insects. **Rarely dangerous to man and will constitute a good source of food.**

However a **warning** about crabs and lobsters claws, they can cut your fingers off, if you let them, so reach them from the back **NEVER** from the front, or you'll be sorryyy! To eat them you boil them in sea water till they become red shy. **They are deliciousss!**

SEA CUCUMBERS:

They are comestibles, yet some species will give off a visceral liquid which you **MUST** protect your eyes from it.

In some regions of the Pacific and Indian Ocean certain species constitute an **important food source** but you **MUST** first eviscerate them, = to remove the 5 muscular bands. **Can be eaten smoked, marinated or cooked.**

SURVIVAL COAST OR ANYWHERE ELSE:

CONSERVING OF ENERGY is ESSENTIAL to SURVIVAL! (Put in psycho as well)

Under primitive conditions, the task of supplying oneself with food & water, constructing shelter and needed utensils is a full-time exhausting job under the best of conditions.

Hard work requires adequate fuel for the body and in the primitive life the getting of food and water is tiring.

It is a vicious circle that **NEVER** relents. The "Lazy native" has by necessity learned to satisfy his basic needs in what appears an easy going way.

FIRST RULE IN SURVIVAL:

TO TAKE IT EASY & MAKE TASK LIGHT.

ADDED TIPS TO CASTAWAYS:

(WHENEVER POSSIBLE OF COURSE))

1) Don't inflate the raft nor life jacket aboard the plane.

2) Pick up any rescue material before ship or plane sinks.

2 B) **DON'T FORGET TO BRING THIS BOOK ALONG.**

3) Attach the rafts to the plane till all are aboard and have someone in charge to cut off as soon as the plane starts to sink./ b: Make a roll call to find all passengers.

4) If possible load & board the raft directly from the plane without getting in the water, getting in cold water could have very grave consequences. **Don't jump in the raft.**

5) **Be careful** to maintain the equilibrium of the raft loading the heaviest at the centre, know what to do if raft capsizes.

6) Get away from oil or gas spill or of any embarkation that is going down, direct the raft toward any current if any.

7) Try to find the missing passengers by following the waves movement.

8) Recuperate all floating pieces of equipment, tie them to the raft or get them aboard.

Check for any air leaks or worn out points. Empty the water that seeps in. Be extra careful not to puncture the raft with sharp tools or shoes

9) In freezing ocean, protect yourselves by erecting a wind breaker, gather yourselves closely one to another and do regular physical warm up exercises.

Pair off back to back with a ground sheet around you, sitting on packs etc., this method of back to back gives a good deal of warmth.

10) Check the health conditions of all, give the first aid needed take sea sick pills, remove all oil or gas which covers you.

11) Attach all rafts together with about 7 metres rope in between at the floating level line, when the sea is rough, shorten the rope, when a rescue plane shows up, bring all rafts together.

12) After having read the instructions, start the rescue radio use the radio only when a plane is heard by.

MAKE SURE ALL OTHER SIGNALISATION EQUIPMENT CAN BE USED INSTANTLY.

13) If needed, you **MUST** repair quickly a raft with the appropriate adhesive aboard, most if not all rescue raft have these patches.

14) Compass, watches, matches, lighters **MUST** go in waterproof containers.

15) In tropics ocean, you **MUST** protect yourselves under a tarp wear clothes covering both legs and arms.

Cover your face and hand with solar lotion and put some oil or grease on your lips, protect your head and eyes from sun rays.

16) Calmly evaluate the situation, and **carefully** plan your action program, make and keep busy. Each one has a task to do except of course those who are sick or wounded.

17) Ration water and food, share the responsibilities, gather the rain water with a tarp or wind breaker.

Start drinking sea water if soft water supply is very low, **during the first hours.**

18) Write down in a log book the last position you were at when crashing, the hour you crashed, name and state of health of the castaways.

18b) Food and equipment inventory, sails orientation, the hour of the rise & fall of the sun and all other needed information for the navigator.

19) Stay calm! Saving energy you will save on food & water demand. Don't yell nor move uselessly.

Try to keep a certain humorous mood, target on your lousy travel agent! Don't forget that sea survival depends of the complete cooperation of every one.

Make everything in your power to be seen by rescue plane. Mirrors **MUST ALWAYS** be hand ready. Flares, radio & signal panels ready to go in a flash.

20) In Temperate Regions you can survive many days at sea if you without a raft if you wear a life jacket, yet you **MUST** have a signal mirror to show your presence.

SURVIVAL AT SEA:

Conditions of survival at sea are perhaps worse than those of any other environment and make the sternest demands.

Planes and boats carry survival equipment, but even getting into a dinghy in a heavy sea can be difficult.

Once any emergency supplies of food and water run out, & other sources are not reliable. So any possibilities of obtaining food from the sea and collecting drinking water **MUST be exploited** to conserve supplies as long as possible.

Not all fish are edible and some are even dangerous to handle. Shark dangers are often exaggerated but should not be ignored. Appropriate action is needed to **AVOID** or deter them.

A difficult coast can make even a final landfall **dangerous**, so heed to the advice on lessening the risks.

4/5th of the earth's surface is open water-probably the most frightening of all environments and the most difficult in which to survive.

In cold water the body soon becomes chilled and even in a boat wind can chill the body rapidly. Alone in cold water your chances are not good without equipment.

If you know your location and the main ocean current you may be able to predict where they will carry you, though it will be very slow.

Warm currents, such as the Gulf Stream across the North Atlantic, are **rich in fishes** and sea creatures.

Coastal waters are also often rich in sea foods-but there are dangerous species, such as sharks, and poisonous species, mainly living in shallower water near lagoons and reefs in warmer climates.

Fresh water is a bigger problem if you have no means of distilling sea water.

LIFEBOAT DRILL:

It is carried out on every ship soon after it sails and should become a well-rehearsed procedure.

Passengers are instructed in how to fit life-jackets, how to proceed to their lifeboat stations and what to take with them. Sailors in small boats should also devise such a drill and instruct everyone on board.

Safety equipment could include rigid boats, simple rafts, inflatable dinghies, life-belts or life-jackets.

If the signal is given to abandon ship put on warm, preferably woollen, clothing including hat and gloves and wrap a towel around your neck.

Clothes will not drag you under if you end up in the water and they will help ward off the worst enemy = exposure. Take a torch if you can and grab chocolates and boiled sweets if they are handy.

DO NOT PUSH OR SHOUT or you may start a panic-an orderly embarkation into lifeboats and on to rafts or dinghies will be faster in the long run and established a calmer attitude.

Don't inflate your life-jackets until you leave the ship or plane. **On small boats life-jackets should be worn all the time.**

They are brightly coloured and are usually equipped with a whistle, light, marker dye & when for use in warmer waters -a shark repellent.

If you have to jump overboard, first throw something that floats and jump close to it.

MAN OVERBOARD: (OOPS!)

If you have been swept overboard your first aim, apart from keeping afloat, will be to attract attention. (Call 911?) Sound travels well over water, shouting splashing can be effective.

Wave with one arm above the water(not both you will go under) movement will make you more noticeable.

If you are wearing a life-jacket and on a small boat you **ALWAYS** should be, it will probably be equipped with a whistle and a light as regular issue. Mae West usually are.

SWIMMING:

Swim slowly and steadily. If you are abandoning a sinking boat or aircraft get upwind and stay clear of it. Keep away from any oil or fuel slick.

SWIMMING THROUGH FIRE WATER:

If there is a fire and you have to enter the water or swim through flames, jump into the water feet first and up wind, swimming into the wind using a breast stroke.

Try to make breathing holes by splashing the flames away from the head. If the fire is not too extensive it is best to swim underwater until clear of that danger.

If there is a **danger of an underwater explosion while you are in the water, the risk of injury will be reduced if you swim on your back.**

Wind driven survival craft travels faster than burning oil unless they are well sea-anchored.

But if it is necessary to swim through burning oil, swim to windward, using the breast stroke to sweep the flames aside.

In intense heat it may be necessary to swim underwater, rising to the surface only to breathe, in which case a life-jacket and bulky clothing cannot be worn.

FLOATATION TROUSERS BAGS:

You can improvise a short-term floatation bag from a pair of trousers. Knot the bottoms of the legs, sweep them over the head to fill with air, then hold the waist below the water to trap the air inside, making the legs into water wings to lean on.

IMMEDIATE ACTION:

Once you are clear of the wreck and have got your bearings inflate your dinghy or look out for a boat or raft or wreckage which can offer support.

If there is no boat or dinghy grab as much flotsam as possible to use as a raft. Tie it together with anything that is available-ties, belts, shoe laces, spare clothing. **Salvage any floating equipment.**

INFLATING A DINGHY:

Aircraft and many boats and ships carry dinghy type of life boats. Many are self-inflating and activated by salt water immersion. If they do not inflate automatically, there is a pump provided.

There are several inflation points because the dinghy is built in sections, so that if one compartment is punctured the others will still keep the dinghy afloat.

BOARDING AN INFLATABLE DINGHY:

Get aboard as soon as possible. If you are already in the water move to the end not the side of the dinghy, place one leg over the edge and roll into the dinghy.

DO NOT JUMP INTO A DINGHY from above, you may damage it.

To haul someone else aboard a dinghy, raft or lifeboat hold their shoulders and lift one leg over the end, then roll them in.

Discourage them from putting their arms around your neck, they could pull you into the water. Then tie yourself and others to the dinghy.

RIGHTING AN INFLATABLE DINGHY:

Most dinghies have righting straps on the bottom, & larger ones have a righting line attached to one side. Grab it from the opposite side, brace your feet against the dinghy and pull.

The dinghy should rise up and over, pulling you out of the water momentarily. In heavy seas, or a high wind, this can be **EXTREMELY DIFFICULT**.

INFLATABLE DINGHY CHECK-UP:

MAKE SURE that the dinghy is fully inflated. It should be **firm not rock hard**. If it is not you will need to inflate it with your own breath or a pump. The valves are one way and air will not escape when you take off the protective cap.

Check for leaks. Escaping air will cause bubbles under water and above water will make a hissing sound. Deal with them with conical plugs that you will find in the dinghy kit.

They screw into holes and seal them. You will probably also find a supply of rubber patches and adhesive.

MAKE DAILY CHECKS OF INFLATION AND LEAKS. If you suspect a leak on the underside, swim under and insert a plug.

SURVIVAL AFLOAT:

Rafts, boats and dinghy are built to carry a limited number of survivors. The lives of those aboard will be even more endangered if these are exceeded. **The safety of the majority MUST be the priority.**

Place the infirm, youngsters and any injured in the dinghy or boat first and as many of the able bodies as the boat is made to accommodate. The rest **MUST** hang on in the water.

The fit survivors aboard should rotate with those in the water on a regular and frequent change over rota. Stow all gear in any stowage places provided and tie everything securely.

Check that there are no exposed sharp objects which will damage an inflatable (high heels etc.)

MAKE SURE that anything that will spoil if wet is in a waterproof container and kept out of the water.

Check all signalling equipment: flares, rockets, heliograph. If distress signals have already been sent out you will need them to attract attention of rescue parties when they are searching for you.

If a distress call has gone out giving your position it is best to try to maintain location, so put out a sea anchor.

This should look like a large canvas bag. Streamed out from the boat it will keep it into the weather and slow down drift.

You can improvise a sea-anchor from any weighted object secured tied to a line. Even clothing could be used possibly tied to a paddle with reef knots.

WHENEVER POSSIBLE ATTACH ALL OTHER DINGHIES TOGETHER.

It is easier to spot a group than one. Don't tie them too close.

If you do not know where you are, **do not attempt to navigate until you have established your position**, but if you can see the shore head towards it.

4 SURVIVAL PRIORITIES:

PROTECTION:

From the elements and the effects of exposure.

LOCATION: Try to establish where you are & the best way of attracting rescue.

WATER: Take stock of supplies. Ration it at once. Start collecting any rain.

FOOD: Don't eat, unless you have sufficient water. Check all ration available, stow them securely. Start fishing as soon as possible.

PROTECTION:

If you are alone keep a log on a daily basis. This will occupy the mind & help keep you oriented.

First record names of survivors, date and time and position of the accident, weather conditions, equipment salvaged and record sightings and circumstances daily.

IN COLD CLIMATES:

IF THE WATER IS COLD, IT IS ESSENTIAL TO GET OUT OF IT AS SOON AS POSSIBLE.

You need to counter the chilling effect of the wind, especially if you are wet.

KEEP THE BOAT OR DINGHY AS DRY AS POSSIBLE.

Bail out all the water and rig an awning to keep out spray if you can find any material to use for it.

Dry all wet clothing and if there is not dry clothing to put on squeeze out as much water as possible and then put it back on.

Maintain body heat by wrapping all parts in any available material, such as parachute or canvas. If in a group of survivors then huddle together to keep warm.

To prevent stiffness to muscles and joints and to keep the circulation going, do mild exercises, such as stretching and arm circling.

Be careful not to disturb the balance of the raft or boat by excessive or sudden movement. Most modern dinghies have a built-in shelter. If yours doesn't, rig a windbreak and a spray shield.

Stretch any material that is available across to keep out spray and breaking waves.

With adequate shelter and warm clothing, exercise will protect against the risk of frostbite.

IN HOT CLIMATE:

Take off unnecessary clothing, but still keep the body covered. If exposed directly to strong sun **ALWAYS** keep the head and neck covered to **AVOID** sunstroke or burn.

Protect the eyes from the sun glare by improvising eye shields. During the day damping down clothes with sea water will help to keep the body cool.

Yet **MAKE SURE** that you are thoroughly dried out by evening, for nights can be very cold.

REMEMBER that darkness comes quickly in the Tropics.

REMEMBER also that prolonged contact with sea water can cause sores on the skin.

When it is very hot let out some air from an inflated dinghy for air expands with the heat. You will need to release the valves. Re-inflate in the evening when it cools.

WATCH AND LOOK OUTS:

In a group assign watches. **THERE MUST BE A LOOK-OUT ALL THE TIME. EVEN IN DARKNESS.**

Each watch should be for a short period (2 hours) to **AVOID** exhaustion and lack of concentration.

It is better for everyone to have several watches a day than for any one person to have long periods on duty.

It is the responsibility of the watch to look out for shipping, aircraft, signs of land and for seaweed, shoals of fish, birds, wreckage.

They should also inspect the raft for signs of leakage or chafing.

ISLAND NEARBY: ? (CRUSOE?)

When there is no land in sight you may find some of these indicators of land and the direction in which it may be found: see note few pages above and join them

CLOUDS:

Cumulus clouds in an otherwise clear sky are likely to have been formed over land.

In TROPICAL waters a greenish tint on the underside of clouds, known as lagoon glare, is produced by the reflection of sunlight from the shallow water over coral reefs.

BIRDS:

A lone bird is not a reliable indication of land, and after rough weather birds can be blown way off course, but few seabirds sleep on the water or fly more than 100 miles from land.

Their direction of flight is usually outward from land before noon and return in the late afternoon. The continuous sound of birds cries is usually an indication that land is not far distant.

DRIFTWOOD:

Driftwood, coconuts and other drifting vegetation are often a sign that land is near. (Though they may be carried right across an ocean tough luck Charley!)

SEA MOVEMENT:

The pattern of the swell may indicate land. A change in its direction may be caused by the tide pattern around an island.

Prevailing winds build up a swell pattern and the swell is less if the water is protected by land.

If the wind is constant but the swell and waves decreasing you **can be fairly certain that land lies to windward.**

SEA COLOUR:

Water that is muddy with silt is likely to have come from the mouth of a large river.

TRAVELLING:

If an SOS has been successfully sent or you know that you are in or near regular shipping lanes, it is usually **preferable to stay in the same vicinity for 72 hours.**

If none of these circumstances hold, then no time should be lost in getting underway to take advantage of initial fitness and energy, especially if land is known to be near and downwind.

If there are no land nearby, assess the nearest shipping lane & head in that direction

DECIDING FACTORS:

Take these factors into consideration in making your decision whether to stay or travel.

The amount of information signalled before the accident. Is your position known to rescuers? Do you know it yourselves?

Is the weather favourable for a search? Are other ships or aircraft likely to pass your present position? How many days of supply of food and water do you have?

SAILING?:

Your craft will move with the wind and current. In the open oceans current seldom exceed a speed of 9-13km (6-8 miles) per day. Take in the sea anchor. Use the wind if you can.

In a craft with no keel it is only possible to sail full tilt with the wind or at most at an angle of 10 degrees off it. Use a paddle as a rudder. If the wind is against your chosen direction stream the sea anchor to maintain position.

TO USE THE WIND:

Inflate the dinghy full and sit high. Improvise a sail if you do not have one.

DO NOT SECURE ITS LOWER EDGES but hold the lower lines or the bottom of the sail so that if there is a sudden gust of wind you can release them and the raft is not capsized.

IN ROUGH WATER:

Stream out the sea anchor from the bow. It will keep the bow **ALWAYS** into the wind and prevent capsizing. Keep low in the raft.

Do not sit on the sides or stand up. **NEVER** make sudden movements. If there are several rafts or dinghies tie them together.

SIGNALLING AT SEA & HELIOGRAPHS:

Flares, dye markers and movements of any kind are the ways of attracting attention at sea. If you have no signalling equipment, wave any clothing or tarpaulins and churn the water if it is still.

At night or in fog a whistle is useful for maintaining contact with other groups of survivors.

RADIO: (TO SPOCK?)

If a radio transmitter is part of the equipment aboard a life-raft instruction for its operation will be found on its side.

FREQUENCIES:

Are usually preset at 121.5 and 243 megacycles and the range is about 32km (20miles). Transmit at frequent intervals but exercise discretion in using the battery-operated transceivers.

The batteries are more precious than gold.

OTHER SIGNALLING EQUIPMENT:

Sea markers, which release dye into the water, are only of use in daytime. Unless the seas are very rough they will be conspicuous for about 3 hours.

PYROTECHNIC EQUIPMENT MUST BE KEPT DRY, SECURE AND READY!

Read instructions carefully and beware of fire hazards.

Day and night flares are particularly useful. One end produces smoke for day time use.

When firing flares and rockets you are holding a **dangerous** fireworks in your hand.

So **BE VERY CAREFUL** that you do not point them downward or towards yourself or another person.

Use flares **ONLY** when you are sure that they will be seen and fire to **MAKE SURE** that they are **SEEN ONLY** when a plane is flying towards you, for instance, not when it has gone past.

MOST RESCUES HAVE FOLLOWED AFTER HELIOGRAPH SIGNALS HAVE ATTRACTED ATTENTION.

Any shiny reflective surface can be used to signal in this way.

HEALTH & FIRST-AID ADVISES:

EXPOSURE AND SEVERE DEHYDRATION ARE LIKELY TO BE THE BIGGEST PROBLEMS FOR THE OCEAN SURVIVOR.

Seasickness can increase dehydration. Constipation and often, either difficulty in urinating or very concentrated urine is not unusual in sea survival conditions.

Do not attempt to throat them or you could force further liquid loss. If feeling sick, try not to vomit and **NEVER INDUCE VOMITING**.

Continued exposure to salt water can produce skin eruptions. Do not attempt to prick or squeeze any boil or blisters.

As a **precaution** do not damp yourself down too often with salt water to keep cool. If there is any soreness **STOP**.

Protect the eyes for glare off the sea with a mask and if sore eyes are produced by glare, moisten a cloth with sea water and bandage this over the eyes and rest them. Do not do this for too long.

The skin may become sore. Immersion foot can be a problem if subjected to very long exposure in a boat or dinghy awash with water.

Exercise will help protect you from it and from frostbite and exposure. Keep well covered when resting and when on watch, gently exercise the limbs.

WATER:

Although a minimum 1 litre (1 3/4pts) a day is **necessary** to keep fit, it is possible to survive on 55-220 cc (2-8oz).

Even if you have a good water supply, ration it at once, reflecting these minimum needs until you can replenish your supply.

Do not ration until final rescue, for you have no idea how long you will have to last out.

REDUCING WATER NEEDS:

Take all the usual **precautions** against water loss. Reduce sweating as much as possible.

Make use of breezes and use sea water to cool the body. If it is very hot, shaded limited and the waters are safe take a dip over the side, but first check your safety line. **You MUST ALWAYS BE TIED ON.**

Beware of **dangerous** fish and be sure that you can get back aboard. If sea-sickness threatens take anti-sickness pills, if available, as soon as you start to feel queasy, for vomiting will lose valuable fluids.

If you are low on water do not eat. Especially not protein foods which includes fish and seaweeds that require a lot of water to digest. Carbohydrate (sugar and starches) requires less water for digestion.

WATER RATIONS:

DAY 1 = NO WATER. The body is a reservoir and has a store. DAYS 2-4) = 400cc (14oz) if available.

DAY 5 & ONWARDS: 55-225cc (2-8oz) daily, depending on the climate and water available. When drinking moisten the lips tongue and throat before swallowing.

GATHERING FRESH WATER: t

Use every possible container to collect rainwater night and day. You will usually see a rain squall coming and have time to rig up a catchment from canvas or plastic, which will hold much more than cans. At night rig canvas with edges folded to catch any dew.

When in rains drink your fill-but slowly, for if you have been on short water ration you will vomit, if you gulp it down.

Stow as much in containers as you can. Drink up puddles in the boat first but **be careful** in heavy seas as the water will be contaminated with salt.

Water is a good ballast in an inflatable fill it to the brim and it will still float.

SEA ICE:

Ice can produce drinking water. But new ice is salty. **Use Only old sea ice** which is blue-grey in colour and with rounded contours. It can be melted or sucked for the ice loses its salt after a year or more.

In summer, pools on old sea ice may be drinkable if they are not wave splashes. Taste very **carefully** before drinking, for drinking any salt will aggravate thirst.

WATER FROM FISH:

Drink the aqueous fluid found along the spine of large fish and in the eyes. **Carefully** cut the fish in half to obtain it and suck the eye.

If you are so short of water that you need to do this then **do not drink** any of the other body fluids for they are rich in protein and fat and will use up more of your reserve water in digesting than they supply.

TREATMENT OF SEA WATER:

Life raft equipment may include solar stills and chemical desalination kits. They carry their own instructions.

Set solar stills hut **IMMEDIATELY**, but use the desalination tablets only when the weather is unfavourable for the stills and dew or rain catchment is ineffective.

REMEMBER:

Do not drink sea water Bombard via this item! / Do not drink urine, don't drink alcohol / Do not smoke, don't eat, unless water is available.

Sleep and rest are the best way of enduring periods of reduced water & food-but **MAKE SURE** that you have adequate shade when napping during the day and that a watch is on at all times.

MAKE SURE THAT YOUR SAFETY LINE IS TIED TO YOU AT ALL TIMES.

If the sea is rough, tie yourself to the raft, close any cover and ride out the storm as best as you can.

RELAX is the key-word! At least try to relax. Prayers is one of the best way to relax.

FOOD:

Conserve any emergency food supplies until really needed, even then only taking a small nibble and try to live off natural foods. (Perfect diet time!)

Fish will be the main food source. (SUSHI?!) There are some **poisonous & dangerous** ocean fish but in general in the open sea, out of sight of land, **fish are safe to eat**.

DANGER VIA SHORES:

Nearer the shore there are fish that are both **dangerous** and **poisonous to eat** including some, such as the Red Snapper & Barracuda which are normally edible **but**:

POISONOUS WHEN TAKEN FROM THE WATERS OF ATOLLS AND REEFS.

Flying fish will even jump into your boat and they are edible by the way.

FISHING:

Do not handle fishing lines with bare hands & NEVER wrap it around the hands or tie it to an inflatable dinghy.

The salt which adheres to it can make it a sharp cutting edge. A danger both to your hands and to the raft. (OOPS)

Wear gloves if they are available or use a cloth to handle fish to **avoid** injury from sharp fins & gill covers.

Fish and turtles are attracted to the shelter from the sun provided by the dinghy or aft and will swim under it.

If you have a net pass it under the keel from one end to the other. You need 2 people to hold the ends.

Use a torch to attract fish at night- or on a moonlit night lower a piece of cloth, tinfoil or metal into the water to reflect the moon and it may also draw fish to it.

Improvise hooks from whatever is available. Small folding knives, pieces of jagged metal, wire. Small bright metal objects may serve as bait-including buckles, spoons or coins.

If using a metal spoon or spinner keep it moving by paying out & reeling in. Let the bait sink & then retrieve it. Use offal from caught fish for bait.

Fish flesh spoils very quickly within 1/2 hour and in the TROPICS, it MUST be eaten fresh unless the air is dry, which is very unlikely in the tropical seas.

In cooler zones excess fish can be dried in the sun for future meals. Clean and gut before drying.

BIRDS:

ALL BIRDS AT SEA ARE ALSO POTENTIAL FOOD. They will be attracted to a raft as a potential perching place.

Keep still until they settle and you may be able to grab them, especially if they are exhausted by flying in bad weather.

You may also catch birds using lines trailed in the water with hooks or gorges baited with fish.

A diamond shaped tin gorge wrapped with fish and trailed behind the craft will attract birds. When a bird sizes the fish the gorge should lodge across its gullet.

SEAWEED & PLANKTON:

Seaweed not only occurs on shorelines but far out in some oceans. There are floating forms, especially the Sargassum species of the Sargasso Sea and the North Atlantic Drift which is found in many warm waters, and others which grow in the colder waters of the southern Atlantic and Pacific.

Since raw seaweeds are tough and salty they are **difficult to digest raw**. They absorb fluids so **should not be eaten when water is short**.

Seaweeds may also provide goods in the form of the small crabs and shrimps living on them and small fish that you may shake out from among them if you haul some weed aboard.

These small decapods are mottled brown in colour, like the weed, so are not easily seen on it.

PLANKTON:

Strained from the water, can also be **useful food source especially in the cold Southern waters**.

Make a grapple hook by lashing pieces of wood or metal wreckage together to form a multiple hook.

Attach it to a line and trail it behind, or throw it out to rake in weed. You can use it for gathering other drifting wreckage to consolidate makeshift raft.

SEA SURVIVAL:

The following informations have been gathered from generation of seamen and scientist to contemporary nautical knowledge.

These experiences bring up the importance of having available manual which would contain the information which castaways need to know.

Not only to survive the immediate emergency after the disaster but also to provide the data and advises which are necessary to their continued survival in long ordeals.

We will dwell on the basic principles of survival practice. We have no words to offer which may comfort the reader who is also a castaway except that rescue may come at any time but not necessarily when you expect it.

And that even if you give up hope, **YOU MUST NEVER GIVE UP TRYING**, for, as the result of your efforts, hope may well return & with justification.

You can expect good or bad luck, but good or bad judgement is your prerogative as is good or bad management, and it is in the exercise of the last two qualities that this book is designed to assist and in assisting, influence the first in your favour.

EMERGENCY NOTES:

The following is a summary of the survival action to be taken after the decision to abandon ship has been made.

ABANDONING SHIP:

Abandoning a ship or ditching from a plane, it is **ESSENTIAL** that you take what equipment you can with you.

A life-jacket or belt will save a lot of energy that you might otherwise expend in trying to keep afloat. But even without one; it is not difficult to float in the ocean.

The human body is of lower density than salt water and anyone who has learned to relax in water is not in immediate danger from drowning

However, panic or fear makes relaxation difficult and many find floating difficult under these conditions.

Without a life-jacket or life-belt, air trapped in clothing will help buoyancy-a good reason for keeping your clothes on despite the frequent advice that you should strip them off.

ABANDON SHIP: Part 2

Release survival craft. Send Radio SOS to include position. Dress warmly to include waterproof outer clothing with life-jacket over. Collect additional water supplies.

Try to enter survival craft without getting wet, especially in cold weather. Take supplementary fishing equipment food buoyancy. Keep survival craft clear of sinking ship and **dangerous** wreckage.

ACTION IN COLD WATER:

FOR SURVIVORS:

- 1) Enter cold water fully clothed with waterproof outer garment and life-jacket, with whistle if possible.
- 2) When immersed in cold water remain as still as possible until rescuers come to you. Initial discomfort will decrease quickly.
- 3) Do NOT exercise to keep warm. Increased circulation will only **accelerate loss of heat from your body**.
- 4) Exhaustion will immobilise you very quickly in cold water; secure yourself to any necessary material or reserve flotation before this happens.
- 5) Cold injury will not affect you before hypothermia. There is no need to take priority measures to counteract this form of injury.
- 6) If you have no life-jacket, secure yourself to other reserve buoyancy if possible.

FOR RESCUERS:

1) IF SURVIVOR IS UNCONSCIOUS AND NOT BREATHING. Note probability of drowning from posture in the water. Apply mouth to mouth respiration.

Do not stimulate circulation by rubbing or by applied warmth, particularly if the casualty is very cold. Allow recovery to take place slowly in normal temperatures.

2) IF SURVIVOR IS UNCONSCIOUS AND BREATHING SLOWLY.

DO NOT APPLY mouth to mouth respiration. Strip off wet clothes by cutting. Place survivor in un-warmed but dry insulating bag.

Leave to recover without further assistance or interference (except if "buddy warming" technique described on page 16 is implemented.) unless breathing stops. The survivor may be assisted to re-warm **ONLY** after consciousness is regained.

IT IS OF THE UTMOST IMPORTANCE THAT VERY COLD & UNCONSCIOUS SURVIVORS SHOULD BE DISTURBED AS LITTLE AS POSSIBLE.

Clinical assistance should only be given where expert care is available.

ACTION IN ALL WATERS:

Bind wounds and look out for sharks and other **dangerous** fish. Strike them if they come near enough but do not splash the surface of the sea in an attempt to frighten them away as this is more likely to be interpreted as a distress signal, which will stimulate attack. (see surv.sea file there seem to be a Contradiction here on this item)

Maintain contact with other survivors and secure yourself to any useful flotsam which will assist the survival of others or which may be used to ward off predators.

ACTION ON BOARDING SURVIVAL CRAFT:

Assist other survivors to board and secure useful flotsam. Attend to injuries and if in cold areas, guard against onset of illness or injury from cold.

Examine inflatable raft for leaks and guard against excessive leakage of carbon dioxide gas into an unventilated raft.

If there are more than one raft, secure them to each other.

In rough weather, fit tension buffers to sea-anchor lines and also to lines joining raft; this should be done with the minimum of delay to **avoid** damage to flotation chambers.

POST LOOKOUTS TO GUARD AGAINST DANGEROUS WRECKAGE.

Anti-seasickness pills should be given before seasickness starts, to **avoid** loss of body fluid. If castaways are already seasick administer suppositories if available.

Assess further action only **after very careful consideration** of all the factors involved.

These **MUST** include the likelihood of search and rescue, position with reference to ocean current and proximity to shipping lanes. (Not shopping lane?)

The decision you are faced with at this time is the most important of your life; after GOD and your marriage?

It should be taken only after full consultation with all the survivors and with the help of the best available information.

DISTRESS SIGNALS:

International regulations for preventing collisions at sea. When a vessel or seaplane on the water is in distress and requires assistance from other vessels or from the shore.

The following shall be the signals to be used or displayed by her, either together or separately namely:

- 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 shells, throwing red stars fired one at a time at short intervals.
- 4) A signal made by radiotelegraphy or by any other signalling method consisting of the group ...---... (SOS) Morse Code.
- 5) A signal sent by radio telephony consisting of the spoken word "Mayday" (From the French; help me or M'aidez!).
- 6) The International Code Signal of distress indicated by NC.?
- 7) A signal consisting of a square flag having above and below it a ball or anything resembling a ball. (Having a ball yet?)
- 8) Flames on the vessel (as from a burning tar barrel, oil barrel etc.)
- 9) A rocket parachute flare showing a red light.
- 10) A smoke signal giving off a volume or orange-coloured smoke.
- 11) Slowly and repeatedly raising and lowering arms outstretched to each side.

RADIO NOTE: t

Vessels in distress may use the radio-telegraph alarm signal or the radio-telephone alarm to signal to secure attention to distress calls and messages.

The radio-telegraph alarm signal which is designed to actuate the radio-telegraph auto alarms of vessels so fitted, consist of a series of **12 dashes, sent in 1 minute.**

The duration of each dash being 4 seconds, and the duration of the interval between 2 consecutive dashes being 1 second.

The radio-telephone alarm signal consists of 2 tones transmitted alternately over periods of from 30 seconds to 1 minute.

The use of the foregoing signals except for the purpose of indicating that a vessel or a seaplane is in distress and the use of any signals which may be confused with any of the above signals is prohibited. (This is not the time for fancy jokes!)

Visual distress signals call the attention of passing ships aircraft or coastal watchers to the plight of the survivors.

A great deal of expertise has gone into the manufacture of pyrotechnic signals of distinctive and easily detectable pattern so that they will function efficiently in severe weather conditions with a minimum of effort.

But no amount of skill on the part of the manufacturers can make a visual signal effective if nobody is looking

Modern ships have auto-pilots for helmsmen, radar scanners for lookouts and if it is the castaway's misfortune to encounter a vessel that has no proper lookout the chances are that his distress signal will burn out unseen.

IN THE DAY:

MOST RESCUES HAVE FOLLOWED AFTER HELIOGRAPH SIGNALS HAVE ATTRACTED ATTENTION.

It is of some use, therefore, to try to attract attention in daytime by a heliograph.

Or by making black smoke, so that a casual onlooker may be watching when the distress signal is actually fired.

For the same reason, it is better for a hand flare to be fired before the discharge of a rocket flare, especially at night.

The orange smoke of distress flares is sometimes difficult to see from a distance, especially in quick dispersal conditions, but a source of black smoke is usually investigated by a watch keeping officer or perhaps an off-watch crew member with binoculars.

Thus in addition to the regulation distress flares, emergency kits should contain a means of making black smoke as well.

A small bottle of paraffin sprinkled over surplus rubber material, tied to a paddle, lighted and held to leeward of a raft may suffice.

This also makes an effective night distress signal (except in areas such as the China coast where this is a customary method used by junks to warn ships of their presence).

Water dyes are very useful for attracting attention of searching aircraft but are not included in many survival packs.

SIGNALS AT NIGHT:

Attracting attention at night is easier because flares can be seen over much greater distances. Distress rockets and hand flares can be visible in excess of 20 miles and torch signalling at 5 miles.

When using the Morse SOS, due regard should be given to the height of the swell when the survival craft is in the trough.

Such signal should be slow and regular in calm weather, but in heavy seas an attempt should be made to transmit the full SOS while on the crest of the wave.

Otherwise the light may be mistaken for a small boat's navigation light dipping behind the waves.

Some form of sound apparatus (horn or whistle) should be available to enable the castaway to attract the attention of unseeing ships on their close approach.

The shouts of dry-mouthed weakened castaways do not carry very far but even so, these have been responsible for rescue being effected when all visual means had failed.

Many types of radio apparatus, in the form of beacons, or small radio-telephone are now available in survival packs.

Radio-telephones though more expensive, have the advantage of providing 2 way communication over longer distances than beacons, which have a very limited range about 20 miles to searchers at sea level but up to 200 miles to searching aircraft.

Both beacons and radio-telephones are made to function automatically on distress frequencies and in the case of radio-telephones, transmission may be interrupted to broadcast a distress message and receive acknowledgement if communication is established.

Radio transmissions are usually limited by reserves of electrical energy, which particularly on radio-telephones is quickly exhausted if continuous transmission is maintained.

Some energy should be kept in reserve to assist search and rescue craft to "home" in on RFD bearing.

PROCEDURE ON ABANDONING SHIP:

While it is **vital** that survivors suffering from injury, near drowning, immersion hypothermia or cold injury be brought aboard the survival craft as quickly as possible and given immediate care.

IT IS ALSO PARAMOUNT IMPORTANCE THAT ANY DEBRIS FLOATING NEARBY SHOULD BE SCRUTINIZED:

And if of the slightest possible use and not dangerous to the survival craft, be secured alongside or brought aboard depending on the permeability of the material.

The lives of the uninjured as well as the injured can sometimes depend on pieces of flotsam saved at this time.

Materials to **avoid** are those with sharp edges which could be **dangerous** to inflatable craft.

Heavy materials (spars etc.) should not be tied alongside rigid survival craft where they could cause hull damage but may be secured to the sea anchor by a separate line to float clear of the survival craft.

Foresight at this stage is all important, for damage sustained as the result of a thoughtless action may shorten the effective life of the survival craft and this:

CAN MEAN THE DIFFERENCE BETWEEN LIFE AND DEATH.

Any buoyant materials should be secured in a safe place regardless of their apparent uselessness at the time.

Reserve buoyancy & waterproof container space are the castaway's two most precious assets, followed by shelter & warm clothing in cold areas, shade in tropical zones.

ADDITIONAL WATER RESERVES ARE VITAL IN ALL CLIMATES.

? Painters should not be secured to any part of the parent craft which is strong enough to allow the raft or boat to be dragged down with the sinking vessel before survivors have time to cut free.

Additional stores should be secured to rafts or survivors by lines until they can be brought aboard.

If the choice is available, it is better to lie leeward (explain at the start of the file) of a sinking vessel, where some shelter may be gained while picking up the survivors and where useful flotsam will drift down wind after the vessel has sunk.

The danger of a wind-driven hulk drifting down on a survival craft can be met by fending off.

If you have to enter the water without the prospect of reaching a survival craft it is better to go over the weather side where the hulk will not drift down on top of a swimmer.(PIX could help to explain)

If the parent craft is sinking rapidly, survival craft should be moved far enough away to **MAKE SURE** their safety.

Safe distances depend on the nature of the disaster. For instance there may be a danger of explosion or burning embers may cause damage to inflatable craft.

Waves caused by capsize and suction from large vessels present a hazard to a survival craft as do buoyant materials breaking free from the sunken vessel and moving swiftly to the surface.

Damage to inflatable can result from severe abrasions from the barnacled side of the parent craft and all survival crafts are in danger, on the weather side of a ship, of being smashed or punctured beyond repair.

SURVIVAL IN WATER:

Beside drowning which is the most common cause of death at sea and the most effective resuscitation treatment in survival conditions is the mouth to mouth method of artificial respiration (see first-aid). The second most common danger to life is Hypothermia check for repeat

TROPICAL IMMERSION:

A type of immersion injury which has no connection with cold may be experienced by survivors who are forced to have parts of their bodies soaked in sea water for long periods.

Swelling and tenderness on the tips of fingers and toes are particularly painful but this can be reduced by making determined efforts to keep the affected parts from remaining saturated.

Apply a barrier cream or oil if available, although this will quickly be rubbed off the skin if it is exposed as in tropical conditions. (Coconut oil is best).

Other types of skin eruptions result for long periods of sea water immersion in the form of a rash & boils.

Appearing first usually on areas of most frequent contacts, i.e.; hands, elbows, buttocks & knees and then spreading gradually to other parts of the body.

Once incurred the sores take quite a long time to heal and the pain from them is considerable and often demoralising.

Try to **AVOID** wearing wet clothing on the area of sores and if rain showers permit, wash the slat from the affected parts.

Although healing takes a long time, the inflammation and pain except through direct contact are quickly alleviated if a 48 hour period of salt free exposure can be achieved.

Much care is necessary to **AVOID** the onset of sea water boils and this is often not possible if survival obligations intervene.

If so, a determination to endure and an infinite sympathy for your fellows in **AVOIDING** inflicting pain when moving around, can help compensate for and assist suffering.

Established boils should **be left strictly alone**; any attempt to squeeze the pus from them should be resisted strongly as this results in further damage to tissue and prolongs the healing period.

OTHER MISCELLANEOUS DANGERS:

SHARK OR BARRACUDA ATTACK:

Generally, the rule governing survival against attack is that those who prove able to defend themselves will be left alone.

Except in an attack by extremely large predators against which normal weapons would be useless anyway. This is primary law of savage survival which hold goods for all time.

CRAMPS:

Although painful is not a common cause of drowning for this is usually associated with tired muscles.

Swimmers who suffer from cramp can usefully allow the affected parts to remain idle, for this is also the way to resist the speedy onset of hypothermia.

Cramp does not prevent a swimmer from floating on the surface of the water in the normal "at rest" posture.

ASSESSMENT OF COURSE OF ACTION:

One of the most difficult decisions has to be taken once the initial work of reviving casualties & collecting useful debris has been completed:

Whether to stay in the area of the sunken parent craft (as much as is allowed by wind & current) and hope for rescue; or whether to strike out immediately for the likeliest landfall.

The decision is made easier by a careful assessment of probabilities.

Waiting time limits can be variously estimated if there is the probability of a search and rescue party being launched towards the scene of the disaster.

1) If radio contact has been made through distress channels, and your plight acknowledged.

Try to stay as near the scene of disaster as possible. Allowances will be made by rescuers for your likely drift.

2) If radio distress signals have been sent at the correct time on the international wave-lengths.

Even if no acknowledgement has been received, a certain amount of time **MUST be allowed** for response before leaving the disaster area. (72 hours)

This length of time can only be assessed in relation to the accuracy of the disaster position being known to the rescuers and the likelihood of a search being launched.

If no search aircraft or ships are sighted within 3 days alternative action should be put into effect.

3) If portable radio beacons are carried it should be **REMEMBERED** that they have a very **limited range about 25 miles at sea level**, but may be received by aircraft at longer distances. (Up to 200 miles).

As in section 2 if no response is observed within 3 days, alternative action should be taken. (Beam me up Spock!?!)

4) If no radio signal has been made, the probability of search and rescue will diminish in proportion to the size of the disaster, its commercial significance and the distance from search & rescue services.

Aircrafts are tracked fairly accurately and a successful search is possible if the disaster has occurred along the established route.

Larger vessels are similarly well reported and investigated but smaller fishing boats and yachts cannot expect assistance until well overdue at their destination & often not then.

In such cases there is little point in remaining at the site of the disaster any longer than is necessary to recover useful debris and survivors.

TO MOVE OR NOT AND WHERE? 4 MAJOR CONSIDERATIONS:

The decision now has to be made as to the direction in which to travel.

There are 4 major considerations to take into account and we place them in order of importance to survival.

1) Water 2) Ease of progress

3) Landfall 4) Rescue

1) WATER:

If the disaster has taken place in an area where there is little rain it is **ESSENTIAL** that the survival craft should be directed with all possible speed to the nearest area of rainfall.

Consultation of the survival chart (appropriate time of the year) in conjunction with ocean winds and currents is **VITAL** for this decision. **A wrong decision in this matter could be fatal.**

2) EASE OF PROGRESS:

This can certainly be associated with primarily, favourable currents and or favourable winds.

Once again consultation with the chart is **ESSENTIAL** before a decision is made.

In terms of effort, a survival craft can travel down wind at 40 miles a day while the occupants rest and conserve their strength.

The same occupants can exhaust their lives from their bodies in an attempt to travel up wind and current without gaining a yard.

Thus survivors could successfully make a landfall 2,000 miles to leeward or die in the attempt to make land 200 miles to windward against the set of current.

THE DECISION TO TURN AWAY FROM THE NEAREST BUT UNFAVOURABLY SITUATED LAND IS A VERY DIFFICULT ONE TO MAKE IN SURVIVAL CONDITIONS BUT IT IS OFTEN THE RIGHT ONE.

The problem of direction having been settled, the whole concept of survival takes on different values.

NO GREATER MORALE BOOSTER:

THERE IS NO GREATER MORALE BOOSTER THAN A POSITIVE COURSE OF ACTION WHICH CAN BE SEEN TO BE WORKING TO THE CASTAWAY'S ADVANTAGE.

3) LANDFALL:

The ultimate aim of the castaway, who should bear in mind that the land aimed for **MUST be able to support life** and therefore probably be inhabited and that is **MUST** be large enough to allow for errors in navigation commensurate with distance run.

To travel 200 miles and hope to sight a low-lying island a mile in diameter would be stretching dead reckoning beyond the bounds of credulity.

The actual sighting of the island after such a run in a survival craft would be a matter of good luck rather than good judgement.

The landfall aimed for should be the largest chunk of land in the general direction of travel and survival time estimates for stores should be based on the distance of this land from the scene of the disaster.

4) RESCUE:

Rescue comes regrettably last in the prospects for the castaway, not so much because the chances of sighting a ship are so remote.

But rather because the chances of sighting a ship which will pass close enough to see or hear the signals of the survivors are a matter of coincidence rather than design.

A raft may lie in a busy shipping lane for many days and be passed by several ships without being sighted. Or survivors may meet a solitary ship in mid-ocean & be picked up.

This is particularly so since the advent of auto-pilot and radar and the castaway should be careful not to exhaust his store of flares in frustrated anguish at a ship's passing.

NAVIGATION:

It is of necessity the sort of rough and ready reckoning adopted by seamen before the present era of scientific calculation.

The modern castaway has certain navigational knowledge at his command, however which will help him.

Not only to arrive at a more accurate estimate of progress, but also to determine the direction in which he will be most likely to reach safety of inshore where the sharks of the IRS are awaiting his return

The accuracy of his calculations may be of considerable importance in assessing the period of time that stores **MUST** be made to last, and his estimates **MUST ALWAYS** take into account the unhappy consequences of raising false hopes in the other persons' mind.

Moral stamina can be seriously undermined by a succession of disappointments over estimated times of arrival. (Next year in Jerusalem?)

So that it is better to err on the side of caution when you cannot confirm your progress by a positive land identification.

Survival craft navigation is largely a matter of estimating the effect of the various forces of the wind and current upon the craft during each 24 hours period.

And applying the set and drift to any sailing or rowing progress achieved during the period to find the day's run.

A careful study of the ocean charts is **necessary** and if possible each day's run means course and estimated position should be noted in a log book even if no progress is made.

So that the navigation should keep in close touch with the craft's position if the chart should be lost or ruined.

WITH COMPASS:

If a compass is supplied with the emergency kit, amplitudes or bearings of rising and setting bodies of sun and planets **MUST** be **carefully** recorded, so that if the compass is later lost.

The recorded bearings which change substantially with alteration of latitude and time of year can give subsequent guidance.

The moon changes declination rapidly and is not suitable for that purpose.

The **compass MUST** be checked on the Pole Star or the Southern Cross at its zenith, at intervals to **MAKE SURE** that it is functioning correctly.

And care MUST be taken to see that NO METAL is near enough to the compass to cause deviation when checking the course run.

In order to determine the course more accurately, a small line should be streamed, its direction noted and the reciprocal used.

Magnetic variation should only be applied to a steering course if above half point in quantity, since in rough and ready reckoning the finer adjustments of navigational accuracy can be ignored, for in rough and ready progress they cannot be implemented.

WITHOUT COMPASS:

If without compass, the course made good should be noted in relation to the direction of the primary swell and any steering carried out accordingly from this directional aid.

Sea swells caused by winds from remote (as opposed to local) areas is the one factor which is least likely to change direction without being noticed.

The geographical direction of the primary or dominant swell should be noted at sunrise or sunset if possible.

And also the directions of any cross swell which may become dominant during the period, before the opportunity to take another bearing presents itself.

The wind and sea can change direction in an overcast sky without being noticed by the watch-keeper and even in monsoon or trade winds areas, large local variations in wind direction can take place as atmospheric pressure fluctuates.

The primary swell will remain constant in direction throughout these changes. When a course is being steered a light line should again be thrown at the stern to help your evaluations.

SAILING STORM PREVENTION:

Quickly they dressed the boat for foul weather, dropping the mainsail around the boom, stowing the jib, raising a smaller storm jib.

Dropping anchor with a 100 yards of line from the stern (back) rigging 2 drag anchors out of 5 gallon water pail & attaching each to 300 yards of line.

These drags anchor lashed to the outriggers would slow the boat if the winds hit hard. They hoped to go downwind tatter than tack, riding the waves like roller coaster.

CARE OF SURVIVAL CRAFT INFLATABLE:

Modern inflatable survival crafts of approved makes are constructed from proofed fabric of sufficient strength and durability to satisfy the high standards laid down by the Safety of Life at sea convention.

It does happen, however that because of damage incurred during the disaster to which inflatables are particularly vulnerable and subsequent leakage or because of changes in temperature, that pressure is lost from the flotation chambers.

Pressure should be replaced frequently to keep the chambers rigid & so prevent the fabric from flexing in the seaway.

Flexing accelerated the rate of wear & while the fabric is designed to withstand a minimum of 30 days exposure in all sea conditions, the craft may have to last considerably longer.

Care taken to preserve the fabric in the initial stages of the ordeal will therefore have a pertinent bearing on this.

Any damage to the fabric should be made as good as soon as possible.

Usually external damage can be more easily repaired with the use of plugs than by trying to apply adhesive solution to wet fabric. Internal damage is more readily repaired with patches.

Spars or paddles should not be used to support canopies on inflatable craft unless special provision is made by way of reinforcement and protection to **avoid** chafing by both the spars & their lashings.

Continuous chafing of this nature can destroy the fabric in a week.

EXTREME CARE SHOULD BE TAKEN to MAKE SURE that grab lines, trip lines, towing appliances, sea anchor ropes etc. **do not foul and chafe the fabric.**

FREQUENT INSPECTIONS ARE NECESSARY to MAKE SURE that the fabric remains chafe-free; prevention is the best repair.

The consequences of overlooking an area of chafe can result in long periods at the bellows to keep flotation chambers efficient.

Often the bellows themselves are inefficient both in volume & construction. When this happens the castaways **MUST** then cut off the bellows tube and blow through it by mouth.

This is an exhaustive routine **but it may be the only way to keep the fabric rigid** until the site of the pressure loss is located and repaired.

Bellows tubes should be fitted with a small junction piece near the bellows chamber to allow for this emergency procedure.

PRECAUTIONS MUST BE TAKEN in areas of ice to protect the fabric from sharp floe edges; small granules of slush ice may also wear the fabric quickly and any form of protection which can be afforded to the fabric is better than none.

Where there are a number of occupants in a raft, care should be taken to **AVOID** excessive wear in the positions of greatest usage.

Particularly around doors where watch-keeping is carried out, and on central divisions where heavy strain is imposed by occupants attempting to stretch out.

The area where the floor of the raft joins the side flotation pieces is also subject to heavy stress, and although wear here may not result in loss of air pressure it does allow a flow of sea water on to the floor of the raft.

Causing severe discomfort, salt-water boils, and probably some form of immersion injury will follow, particularly in cold-water areas.

SPONGE OFF VERY OFTEN!

In areas where there is much evidence of surface marine life and particularly where sharks or turtles are numerous, the fabric of the inflatable is under stress from bites and from contact with the harsh skins of these creatures.

They should be warded off at every opportunity with paddles or improvised spears unless they are required for food.

In rafts with canopies, in warm weather areas, holes can be made in the side of the canopy through which the occupants can strike at fish or turtles rubbing on the sides of the flotation chambers.

If game fish and sharks strike frequently at the edges of the raft, as they will in areas where there is a high dorado or dolphin fish population.

They may be diverted by trailing a skirt of any sort of material around the edges of the raft to create an area of shadow beyond the flotation chambers.

When repairing worn areas the weakness of the surrounding fabric should be taken into consideration and if repair solution or patches are in short supply.

Then it may be more effective to use a plug, round which the weak fabric may be gathered & then bound airtight saving the patches for the smaller holes which will appear later.

CAUTION EXTREME CARE:

When propelling inflatables by oars or paddles over long periods, **TAKE EXTREME CARE TO MAKE SURE that the points of contact between fabric and oar are well protected from wear.**

And that too much strain is not put on the fabric by an excess of zeal. **Especially in dual purpose inflatables where carrying handles are used as rowlocks.**

It is therefore better practice to drop the sea anchor in adverse winds than to attempt to row against them.

RIGID CRAFT:

Whereas the delicacy of inflatable fabric is fairly obvious to castaways, it is not so readily understood that in rigid craft the seams of wooden and metal boats are vulnerable to shock.

Fibreglass and plastic may split or shatter under severe impact; and the danger of capsize or swamping is much increased if operated by inexperienced sailors (including me), especially in high seas.

HEAVY DEBRIS SHOULD BE CAREFULLY WARDED OFF and heavy bumping by large sharks is readily discouraged by striking at them with oar or paddle on their close approach.

Turtles are best discouraged by grasping their hind flippers and holding them captive for long enough (1/2 minute should be enough) to make them realise that the survival craft is not the mate they are seeking.

Striking them on the head or shell takes longer and needs more energy but this may be the only **way to deter** the really big ones from bumping.

Excessive strain through attempting to beat against a short steep sea, especially with a jury rig, can cause extensive damage to small craft, to say nothing of the extreme discomfort to their crews.

It is wiser to lose 20 miles in leeway or elbowroom than to damage the craft by trying to maintain a position in adverse weather, and consequently be unable to make further progress.

RIGID CRAFT NOTES:

Rigid crafts are more stable if the occupants sit in the bottom of the boat rather than on the thwarts.

Buoyancy tanks and spaces should be filled with impervious buoyancy areas are close to the #gunwales# and away from the bottom of the boat.

This also makes it easier to right the craft if it does capsize. (OOPS's!)

A conscious awareness of the elementary principles of stability should be taught to survivors who are unused to boats at the earliest opportunity, so that they can assess the effect of their own movements on the safety of the boat.

Simple practical demonstrations of how movement affects both stability and trim, a favourable sea condition can aver the need for unpleasant preventive action in times of danger.

CRAFTS AND BAD SEA CAUTION:

Rigid craft have the advantage of being more easily propelled through the water by oars or paddles in clam or adverse weather but where a cutaway stern has to be presented to an unfavourable following sea.

SERIOUS CONSIDERATION SHOULD BE GIVEN TO PROCEEDING STERN FIRST, WITH THE BOW PRESENTED TO THE ONCOMING WAVES.

Some form of drogue or sea anchor streamed from the bow is **ESSENTIAL to allow the craft to ride easily without yawing (shifting & swerving).**

Rigid craft are much less comfortable, and if no canopy is fitted, provide less protection against cold.

Spars may be used to rig awnings in **Tropical** zones, or canopies in cold weather and if few materials are to hand, efficient windbreaks can make life more tolerable than in a strictly open boat.

Pressure sores on buttocks or limbs are more likely in rigid craft, especially if there is very little room to move around.

And survivors should take every opportunity of changing position within the compass of the space allowed to them to prevent such sores developing.

Survival craft of all types should be **KEPT AS DRY AS POSSIBLE** to prevent the onset of skin eruptions from continuous wetting by seawater

If it is possible to prevent seawater from entering the craft by rigging canopies or effecting repairs, this should be done in preference to bailing, which is **EXHAUSTING & UNPRODUCTIVE WORK.**

The amount of care taken in handling the craft can be a major factor in the length of time it remains serviceable.

And it is as well to recognise this fact from the start, rather than suffer damage from stress and strain which might have been mitigated by reefing sail or by a judicious use of the sea anchor.

METHODS OF PROGRESS in INFLATABLE CRAFT:

In inflatable craft fitted with solid keelsons (bottom timber), mast and sail may be jury rigged (outfitted) with less fear of chafing than in other types.

ONLY FAVOURABLE WINDS SHOULD BE USED FOR SAILING as any attempt to beat against the wind will be nullified by excessive leeway or elbowroom.

If adverse winds are slight, paddles may be used but, otherwise, the sea anchor should be streamed until a change of wind allows further progress.

In **WARM CLIMATES** where the standard type of inflatable survival craft is fitted with a permanent canopy.

Better progress can be made by turning the open canopy door towards the wind, provided seas are not too rough and maintaining this position by streaming a half-tripped sea anchor made fast to the towing fixtures at the doorway.

If in STRONGER WINDS the sea slops into the raft the door may be closed or turned to the #leeside# of the raft by transferring the sea anchor fastening to the opposite side of the raft.

Progress up to 35 miles a day can be achieved in this way.

In ADVERSE WIND:

Leeway or elbowroom should be restricted as much as possible by a fully opened sea anchor but in heavy seas, too much drag result in heavy buffeting and severe jerking on the raft fixtures resulting in damage to the fabric.

THIS MUST BE AVOIDED AT ALL COST, either by lengthening the sea anchor lines, or fastening a weight between sea anchor and raft to act as tension buffers see pix 364b.

If oil has been collected from sun-dried bird or turtle fat, this can be used to smooth breaking seas.

This is best done by placing the fat or oil impregnated rope fibre, in a cloth bag and streaming it on the windward side of the craft. Oil will spread to windward as the craft makes leeway or elbowroom.

RIGID CRAFT #3:

Only boats with keels may successfully beat to windward in ocean conditions when adverse seas add to leeway or elbowroom in reducing windward progress.

Persevering in this method of progress in shallow-draft boats only exhaust the occupants as well as subjecting the boat to undue strain and possible damage.

GOOD SEAMANSHIP:

In survival conditions it is good seamanship to sacrifice 30 degrees direction for the added comfort and reduced stress which this achieves.

IT IS ALSO GOOD SEAMANSHIP TO LOWER THE SAIL AND RIDE TO THE SEA ANCHOR RATHER THAN RISK SWAMPING IN HEAVY SEAS.

The boat may be steered by an oar in place of a rudder or if proceeding stern first with the sea anchor half tripped, by pulling down on the square sail edge on the side of the desired direction of travel.

IN CALM WEATHER, GOOD PROGRESS MAY BE MADE BY ROWING, ESPECIALLY in an area of fairly frequent rainfall.

A GOOD WATER SUPPLY IS ESSENTIAL to this form of continued progress and to exhaust survivors unnecessarily when no reasonable objective is within reach is bad seamanship and bad husbandry.

In Tropical zone, it is better to row at night and for the oarsmen to rest during the heat of the day.

STORES:

When planning the distribution of survival rations the long period of deprivation should be anticipated.

Survival rations are not maintenance rations, which recognise the body's needs over long periods of time.

Until rations can be supplemented by the survivor's own efforts or by local conditions, the initial survival ration should be the minimum which the body requires for coherent function

This allowance will vary with climate & the individual, and the following are only general guidelines established by survivors in the first 2 weeks after being castaways.

In **Tropical** areas with shade after an initial period of 24 hours without water in order to bring the body to a low level of hydration.

Coherent action can be maintained for a week on as little as one third of a pint of water per day.

Much more water than this is required to maintain life and after 7 days, dehydration may begin to impair judgement.

More substantial amounts of fluid are then required and **MUST** be obtained from other sources if rainwater is not available.

Although the initial effects of dehydration cause much discomfort such as foul taste, absence of saliva, weakness of legs, cracking lips etc.

It does not incapacitate the sufferer, but if delirium becomes established in any of the survivors, the water ration should be increased if possible to prevent the others being affected, since coherent action then becomes difficult.

If circumstances allow, the voluntary rationing of water as a self-imposed discipline is much more effective in conserving water supplies than compulsory rationing.

It is of course **ESSENTIAL** that all the survivors join in the spirit of self-denial and do so by visual means, such as drinking from a transparent jar, but the feeling of need for water and the desire to drink, is much lessened by the principle of self-rationing.

It should not be regarded as a heinous crime if one castaway takes more than his due, but if he does do it consistently, then he should be issued a ration to **MAKE SURE of equality.**

When rain showers of short duration pass over, it often happens that water of varying salt content is collected from the catchment area, because of the need for an initial washing off period.

The less salty water should be kept in reserve to use in place of good fresh water when this is needed for cleaning fabric around leaks before solution is applied, for moistening lips or any such auxiliary needs.

WATER ENEMA:

Foul water which is not poisonous but may cause vomiting; can be absorbed rectally by means of a water retention enema!

In rain storms, when all containers have been filled, additional water may also be taken in this way.

Not only in order speedily to relieve dehydration but also as an additional method of conserving surplus water, for when the stomach shrinks in survival conditions, it is unable to hold much water.

Up to a pint of water may be taken and absorbed through rectal membrane, but it **MUST be REMEMBERED** that salt water taken in this way is equally as **dangerous** as if taken by the mouth. (Up yours Charley!)

Rain should be caught and collected by means of impervious sheet ex: plastic, to reduce any washing off period to a minimum. Rubberised fabrics taint water, but although unpalatable, **it is drinkable**.

NO SPILLING & NO LOST:

EXTREME CARE SHOULD BE TAKEN, especially in crowded craft to put full containers where they will not spill or suffer damage.

Careless handling of containers is a common cause of wastage.

When opening tins of water, a very **small hole** should be pierced on each side of one end of the tin and the water decanted into a clear drinking jar with lid.

When the tins are to be refilled from rain, one of the holes should be enlarged so that the tin may be filled without waste. Plugs should be made ready to use immediately when the can is full.

When using these refills, freshly collected water should be set aside for use in rotation after that previously collected for it sometimes happens that taint develops from many sources in rainwater which is stored over long periods.

In storing tins with plugs which do not fit exactly, when the plugged end is uppermost, the tops of the tins **MUST be protected**, preferably by a snap plastic top, against the intrusion of seawater from spray.

It is often these small relatively simple points of care and maintenance which are overlooked by survivors under stress and which if neglected **cause loss of vital food supplies**.

CONDENSATION:

Can sometimes be collected from surfaces which are salt-free. An example of this form of water collection is a solar which can give up to 2 pints of water a day - survival ration for 6 people to span the gap until rain is collected.

Makeshift condensation units can be rigged with useful results if the right materials are available and conditions are suitable, as they sometimes are in areas of water shortage see pix 366.

Care has to be taken to **AVOID** upsetting makeshift equipment and this can be a major factor limiting the use of stills in a rough sea.

It helps to conserve body fluids in **Tropical** zones if clothes are soaked in sea water frequently to keep body temperatures down by surface evaporation.

Bathing in these zones apart from wasting energy, is not usually possible owing to the presence of sharks, particularly if fish are being caught & their offal discarded

However much relief can be obtained by simply pouring water over yourself and or companions and bailing the surplus overboard. **In ice regions old sea ice is salt free.**

NOTE ABOUT SEA WATER:

There is a very big difference of opinion about drinking sea water see old file on this, and make up your own mind but if you do drink it then you **MUST** follow the directives written by Bombard.

FOOD & WATER:

Food in any dehydrated form need not be eaten (it will not be wanted) when water is very short but the fluid in marine life should be taken **IMMEDIATELY** it is caught so that the full benefit of the moisture it contains may be gained.

WATER FROM FISH:

Fresh-tasting fluid can be obtained from the cavities in the backbones of fish and may be sucked out after the vertebrae have been separated .

The vertebrae of sharks however contain no fluid. Some species of fish have large eyes which may be sucked to obtain the fluid they contain.

The flesh of fish and turtles as well as that of barnacles and similar shellfish which cling to ropes trailed in the sea contains a large percentage of fresh fluid & small quantities may be eaten **immediately**.

They may also be eaten at varying stage of drying but extra water **MUST** be taken to compensate for this.

As for the taste test it should be assumed that if the taste is bland and unsalted, try it, if it tastes bitter or salty reject it.

Surplus marine food should be dried and saved to eat when more water is available. Vivid dreams of fresh fruit & such delicacies are not to be mistaken for hallucinations or delirium but are a natural reaction to the need for moisture.

SUPPLEMENTARY WATER SUPPLIES:

Tropical areas where maximum dehydration conditions exist are fortunately populated by a large variety of marine life which if caught and killed in the correct way, can be used to sustain life of the castaway for long periods.

FOOD ADD ON NOTE:

Many responsible authorities state that protein food should not be eaten on any day when less than 2 pints of water are also available.

But one **MUST** also recognise that there is a considerable difference in the amount of water which needs to be taken with wet protein such as freshly caught fish or turtle and the same protein after it has been dried.

Over long periods of survival level living, the castaway needs to adjust his intake of food from marine life to cope with his long term needs and to prevent his body tissue from wasting away through starvation.

IT IS A FIRST PRINCIPLE OF SURVIVAL:

That the castaway should try to remain coherent and able. And to this end many practical examples may be cited of castaways who over long periods have consumed marine food with considerably less water than 2 pints a day.

And have remained healthy and able with no subsequent ill effects. Indeed if the first rule had been applied they would have died by starvation.

REMEMBER that while caution is praiseworthy in matters of choice, the castaway has little opportunity to pick and choose in the selection or rejection of food and that caution cannot be practised to the exclusion of survival demands.

So the adjustment to primitive eating practice should be made before desperation robs the castaway of basic good judgement of the difference between what is harmful and what is simply disagreeable.

SOMETIMES IT IS BETTER TO LIVE DANGEROUSLY THAN TO DIE CAUTIOUSLY.

DRYING FISH AT SEA:

The flesh of most types of marine life may be sun-dried and stored against the time when rain will provide the castaway with enough water to use it.

If there is the prospect of a relatively dry period of 3 days, the fish, turtle flesh etc. may be cut into strips an inch thick and hung in the open air to dry.

FOR QUICKER DRYING:

The flesh may be shredded into much smaller strips and either laid on thwarts or canopies and turned frequently or hung in rows fastened to lengths of small line.

More fluid is sucked from the flesh in this way but the drying period is reduced by half.

The food may be eaten at any stage during drying, water permitting, so it is better to **START THE DRYING PROCESS IMMEDIATELY for marine food quickly goes bad Very fast, if kept damp in hot weather. (1/2 hour and it spoils)**

Generally speaking ocean and offshore fish make good eating, scavengers or not but the offal and flesh of scavengers should be discarded if the castaway has any misgivings that the fish be poisonous or may have fed in polluted waters.

Fish livers, hearts and roes, taken in small quantities make tasty variation to diet.

Large quantities of fish and turtle liver should be **AVOIDED** to prevent too high an intake of liver oil which can cause illness. The liver may be pulped and the oil strained off & used for other purposes

Several inshore varieties of fish have stings or are **POISONOUS TO EAT** and may be distinguished by their spiny appearance, their puff-up defence mechanism or coral-eating characteristics.

REMEMBER that inshore shellfish such as lobsters, crabs, conch, crayfish, clams, mussels, cockles etc. **make good eating** and are often easier to trap than fish.

But they should not be eaten if from polluted areas nor should shellfish with conical shells be handled because **many are VENOMOUS.**

SEA BIRDS NOTE:

Gulls, boobies and the like will perch on the boat, raft of sometimes on the castaways themselves.

It is easier and better to skin the bird if eating it raw than to pluck it. Useful oil may be obtained from the fat which attaches to the skin.

The fat from birds and turtles should be collected in a plastic bag and hung in the sun.

USEFUL LUBRICANT:

Oil secreted from the fat forms a **very useful lubricant**, & protects areas of tender skin and may be used to smooth breaking seas. Residual fat tissue may be chewed and is very sweet tasting especially in cold weather.

Bones of birds and turtles have a very tasty marrow which is best extracted by chewing the knuckle end & then poking it out with a pointed instrument.

If a castaway's teeth are strong turtle bones can be splintered & the marrow then licked out.

SMELL VIA PALATABLE: (EATABLE)

SENSE OF SMELL IS NOT VERY GOOD GUIDE TO THE QUALITY OF FOOD EITHER WET OR DRY.

Since the castaway quickly becomes accustomed to the disagreeable odours which emanate from drying fish, turtle or bird flesh.

Quality can often be determined by examining the folds of the dried meat.

If they are green or slimy and have a very disagreeable taste, the slough should be scraped off and the food thoroughly re-dried.

If the fibres of the flesh have disintegrated as is likely in continuous wet weather, **it should be thrown away or only use for baits.**

EMERGENCY RATIONS:

If any have been saved from the disaster these should be husbanded with great care and used only when sea food is not available or for special occasions when stress of weather or action stretch the castaway's resources to the limit.

Some of the survivors may be less able to assimilate raw food than others but reluctance to try it should not be confused with inability

METHODS OF CATCHING FOOD:

FISH:

In Temperate zones or Cold water areas, line fishing may be the most practical method of catching fish.

THE STRONGEST TACKLE SHOULD ALWAYS BE TRIED FIRST, at all depths o the full extent of the line.

If bait is taken from large hooks without a successful strike, small hooks down to the size of very small trout hooks, should be tried.

THE BEST BAIT FOR DEEP SEA FISHING IS USUALLY A SMALL FISH, or a piece of fish with a tinsel.

Small fish in the vicinity of the survival craft may be caught by net or trap (see pix later 369 & 367b

Surface fishing by spoon, spinner, feather or straw, even coloured plastic pieces should be tried at varying depths and by skimming the surface at speed to simulate leaping fly or flying fish.

Attracting fish by lure or bait is largely a matter of trial and error, but the **STRONGEST TACKLE SHOULD ALWAYS BE TRIED FIRST.**

Since large fish are reluctant to return after breaking weaker tackle, but small fish become bolder if they have cleaned the bait from a large hook. t

When fishing is in progress the line **MUST ALWAYS** be held ready for a strike, even if it is also secured to the craft.

For valuable time may be wasted if the bait is eaten from the hook unobserved, or even worse a small fish caught unnoticed is then taken by a large predator resulting in the loss of valuable equipment as well as the catch.

When casting away from the craft as in trolling, the **end of the line MUST be fasten to the craft** or help by a helper, otherwise the whole may be lost in a careless cast.

WARNING!:

If fastened to an inflatable raft, the line should be secured to the external grab lines or at a point where it will not foul or cut the raft fabric.

In areas like the Atlantic trades, Dorado or Dolphin fish of average size up to 20 lb or so are fairly easily caught by skimming the surface with a captured flying fish, which also abound in these areas.

In some **Tropical** zones, however particularly in areas where shark and large game fish are numerous, fishing becomes more difficult, for the hooking of one of these larger fish may result in the loss of valuable tackle.

The castaways **MUST** therefore select suitable fish by other means than line fishing, and to do so they **MUST** become hunters.

Infinite patience to await the right moment to strike the right fish, combined with an ability to strike instantly when that moment arrives, is an art which has to be learned with much practice and at the cost of exhausting muscular tension.

But perseverance improves performance out of all recognition and the rewards are very tangible.

SPEAR & GAFF!:

The two most common methods of hunting fish are by spear or gaff.

Spearing may be most effective if the fish is close to the surface, so that force of the thrust is not absorbed by water drag. This of course will diminish if more sophisticated spears are available.

It is better not to strike at a doubtful prey, rather than to strike without killing, for fish quickly learn to keep a respectful distance.

Wounded fish also attract larger predators, which may not only be **dangerous** to the craft but will drive the more eligible fish away.

Ground bait by day or a flashlight if batteries are to spare by night to help to attract fish close enough to enable a strike to be made.

GAFF:

A gaff is a safer instrument for use on an inflatable and also provides a more reliable way of securing the desired fish, especially if it is designed with hunting in mind, rather than merely as an aid to line fishing.

The shaft should be 6 feet long, elliptical in shape, slender & capable of being moved swiftly through the water horizontally as well as vertically.

The hook MUST be Very sharp and barbed and should measure 1 1/2 inches across the curve of the shank.

Both spear and gaff MUST be secured by a line such as the rescue quit line.

When striking with a gaff, the barb should be inserted in the belly just behind the head so that the fish will be swimming in the direction of the pull if the strike is successful.

Game fish are powerful enough to break all but the strongest equipment if the initial thrust is misplaced and the escape dash is away from the line of pull.

For this reason an improvised gaff **MUST** have the hook fastened, so that it is rigid for striking but free to swivel immediately afterwards.

If mono-filament or single strand nylon line is used, it **MUST** be frequently checked for cracks and replaced if suspect.

IMPROVISED SPEARS:

They may be made by lashing a sharply pointed knife to a paddle handle but this method is risky in that a careless thrust could result in the loss of **the knife, the most valuable tool in the castaway's kit** which should not be risked except as a last resort.

Single scissors blades may be more suitable and used against smaller fish, tempted close to the raft by the distribution of ground bait such as flying fish offal or pieces of skin, cloth, tinsel etc.

A swift and sudden stab, followed through in an arc to propel the fish into the craft so that it is secured even if in its struggles it slides off the blade, is **the most effective method of spearing small fish.**

Small sharks may come close enough to craft **especially** at night to strike it with their tails.

The alert castaway may catch such a fish by hand, for the skin is rough and gives good grip; the tail should be secured while the fish is held and killed.

Larger sharks should be beaten off with paddles or oars, especially from inflatables.

OTHER MEANS:

The use of nets for survival is largely restricted to the collection of plankton material, but the small fish which gather around to feed on offal or lie in the shade of the craft may also be caught by these nets pix 368b.

SEAWEED AND GRASS IS MOSTLY EDIBLE:

But is best collected when rainwater is available to wash out the salt.

These plants contain trace elements valuable to the castaway's continued health if he is adrift for a long period of time.

SEABIRDS:

Most ocean coasts are alive with seabirds. Fish for them. Leave baited hooks among offal on flat rocks, even throw baited hooks into the air to be taken on the wind. Try wrapping bait around stones. The sudden change in weight can make birds crash.

Ground nesting birds can provide a rich source of eggs, Look for the ones that are easy to collect before risking raiding nests on cliffs.

You can also try to catch the birds themselves at night when roosting but do NOT risk climbing.

They are quickly killed and easily by placing the thumb on the back of its head and with fingers cupped under its beak give a quick backward leverage to break its neck.

If the castaway keeps very **still and quiet** many birds will come close out of curiosity and can be caught easily even by hand.

POISONOUS & VENOMOUS FISH:

MANY TYPES OF REEF FISH ARE POISONOUS OTHERS VENOMOUS.

Poisonous fishes are usually of the coral-eating type and have large protruding teeth or like the parrot-fish have developed a break suitable for grazing coral.

Scavengers of reef areas may also be **poisonous** from feeding the poisoned flesh of coral eaters & for this reason fish which puff up like balloons when caught and reef predators especially the older variety **should be treated as poisonous.**

VENOMOUS REEF FISH:

They are usually distinguishable by their spiny appearance or by their veil-like appendages which can inflict very injurious stings.

While these forms of fish are to be **AVOIDED** and if in doubt, don't eat them! There are many other forms of reef fishes which are **edible.**

An infinite variety of good eating fish from snappers jacks, grouper, mackerel of various types; down to angel fish and large shoals of "fry" make the rejections of the poisonous fish an easy matter to decide upon in terms of food.

POISONOUS FISH #2:

Many reef fish have toxic flesh, some species at all times and in others only at a certain time of year.

The **poisons are present in all parts of the fish,** but **especially** in the liver, intestines and eggs.

WARNING WARNING WARNING!:

FISH TOXINS ARE WATER SOLUBLE-NO AMOUNT OF COOKING WILL NEUTRALIZE THEM. THEY ARE TASTELESS-SO THE STANDARD EDIBILITY TEST ARE USELESS.

Birds are least susceptible to the poisons so do not think that because a bird can eat a fish, it is safe species for you to eat. Cats appear less affected, though dogs & rats are as susceptible as humans.

POISONING SYMPTOMS:

The toxins will produce a numbness of the lips, tongue, toes and tips of the fingers severe itching and an apparent reversal of temperature sensations. Cold things seem hot and hot things cold.

There will probably also be nausea, vomiting, loss of speech, dizziness and a paralysis that eventually brings death.

MORE on POISONOUS FISHES:

As well as those fishes with **poisonous** flesh there are those which are **dangerous** to touch.

Many kinds of ray have a **poisonous barb** in their tail. There are also species that can deliver an electric shock.

Some reef fishes such as Stone fishes and Toad fishes **HAVE VENOMOUS SPINES** which although seldom fatal, can be **VERY PAINFUL** causing a burning sensation or even agonising pain out of all proportion to the apparent severity of the wound.

Jellyfish, which are sometimes barely noticeable in the water, can carry powerful stings.

The Portuguese man of war (not a true jellyfish) is a bluish bladder-like creature with a small fluted sail.

Do not enter the water if you see these creatures. They trail very long "streamers" which carry **dangerous** and painful toxins.

AGGRESSIVE FISH:

There are also a number of ferocious fish which should be **AVOIDED**. The bold and inquisitive Barracuda has been known to attack man. It may charge lights or shiny objects at night.

The Sea Bass which can grow to 1.8m (5 1/2ft) is another to keep clear of and the Moray Eel, which has many sharp teeth and grows to 1.5m (5ft), can also be aggressive if disturbed.

Sea snakes are **VENOMOUS** & sometimes occur in mid-ocean. They are unlikely to bite but **AVOID**.

HOW TO KILL MARINE FOOD: (Uzi?)

Most small fish in temperate zones are harmless and may be killed by a sharp blow with a stick on the back of the head or by putting a thumb in his mouth and bending the head backwards to break its neck.

In **Tropical** Zone small fish usually have a spiky projection at the dorsal fin, and sometimes on pectoral fins too, so these & **VENOMOUS** fish with stings have to be identified before being brought aboard, especially an inflatable.

They should be first stunned and then made safe by cutting out stings or spikes before being brought inboard to be gutted.

On inflatable rafts they should be landed on the canopy or in a thick wad of cloth while being rendered safe.

Such fish MUST NOT be handled until they are safe, but should be held by gaff or spear clear of vulnerable material and persons.

Hooks should be extracted with the help of artery forceps if the fish is too **dangerous** to touch and the fish then thrown back.

Larger game fish may be killed by severing the head, holding them still by pressing on the eyes with thumb and middle finger, which induces a temporary paralysis in the fish.

Sharks are NOT to be handle in this way however and MUST be held by the tail while they are killed or paralysed by stabbing through the eye, the head is then cut off.

SHARKS: jm

Only a handful of attacks by sharks are recorded each year, & only a minority are fatal.

However the survivor at sea is more vulnerable than the beach swimmer to whom statistics largely refer.

VERY FEW TYPES OF SHARK ARE CONSIDERED DANGEROUS TO MAN.

Six sharks account for most human casualties: the Great White, Mako, Tiger, Hammerhead, Bull and Grey Nurse.

The Great White is the largest but size is not an indication of dangers and bears no relation to the likelihood of attack.

A shark smaller than a man can still kill a swimmer. Basking Sharks and Whale Sharks may be 13.3m (45feet) long but they feed on tiny plankton & are not a problem.

Ocean sharks have the ability to kill but, in the tropics their food is so abundant that they are not usually ferocious.

These sharks are usually cowards and can be scared off by the jab of a stick, especially on the nose. However making a commotion may **attract** sharks from a distance

Sharks live and feed at considerable depths and for most of the time feed off the ocean bottom, but hungry sharks will follow fish to the surface and into shallow water. When it explores such water a shark is likely to be **dangerous**.

A shark's usual diet includes fish, squid, crabs and a variety of other marine animals but it seeks food that is EASY to get and especially goes after stragglers from schools of fish or wounded prey. Sharks will follow a ship to scavenge refuse thrown overboard.

The shark feeds most actively at night and at dusk and dawn. Its small eyes have limited vision and it locates its prey by smell & vibrations in the water. It will be attracted by blood from wound, body waste & rubbish.

Weak & fluttery movements will draw a shark's attention because they suggest a vulnerable, wounded creature. It will be repelled by strong, regular movements and loud noises.

Man's strange appearance is new to a shark and clothing produces a confusing shape. A group of clothed humans bunched together will be safer than a single individual.

If a shark keeps its distance, it is only curious. If it circles inward and begins sudden movement, the likelihood of attack is greatly increased. Some would call it the dinner dance.

Sharks cannot stop suddenly or turn quickly. A good swimmer can evade a single large shark by making a rapid change of direction which the shark cannot match.

FALSE ALARM:

Not every fin showing above the surface is attached to a shark! The wings tips of large rays may break the surface & appear to belong to a pair of sharks moving unnaturally, in perfect synchronisation.

The fins or flippers of whales may also appear likewise those of porpoise and dolphins which are harmless and will probably show themselves more completely.

THE SHARKS SHOWN HERE HAVE BEEN KNOWN TO ATTACK MAN:

GREAT WHITE SHARK: (*Carchaodon carcharias*)

It grows to 6m (18feet) but usually less, grey above, white below, very thick bodied, with pure black eyes and a stubby conical snout; in all oceans but mostly off southern Africa, east and west North America and southern Australia and New Zealand.

MAKO: (*Isurus oxirichus*)

It averages 2-3m (6-9feet) heavy bodied, ultramarine blue above, creamy white below; in all oceans but most abundant in warm temperate waters. A very fast swimmer occasionally leaps from the water.

TIGER SHARK: (Galeocerdo cuvieri)

It averages 3-3.5m (12-13.5feet) heavy bodied, barred or blotched above when young, when mature more evenly greyish above, white below, with a very wide head and jaws and abruptly squared off snout; in all **Tropical** and **Subtropical** waters, often close inshore.

BARRACUDA: (Sphyræna) JM

They are not sharks but thin torpedo-like fishes, bluish-barred above, brilliant silver below, with a protruding mouth packed with sharp teeth some kinds growing to 2m (7ft); in all **Tropical** waters.

Very fast, darting, often in shoals, usually **dangerous** only when there is blood in water.

HAMMERHEAD SHARKS: (Sphyrna)

They are immediately recognisable by their distinctive flattened hammer-like head. There are several different kinds, the largest reaching 6m (18feet); in all **Tropical &Subtropical** waters.

BULL SHARK: (Carcharhinus leucas)

Is found in the **Tropical** west Atlantic with close relatives off Southern Africa, and in the Indian Ocean. Stout, grey above and white below, up to 4m (12feet).

Aggressive and dangerous in its liking for shallow water & ability to ascend far up rivers.

NURSE: (Ginglymostoma)

Such as the grey Nurse of eastern Australian waters, reaches over 4m (13feet) heavily built, large- finned, greyish above and white below. **Often found very close inshore.**

IF YOU CATCH A SHARK:

If a small shark is accidentally hooked it can be hauled to the side of the raft or boat, the head pulled clear & **CLUBBED HARD BEFORE HAULING ABOARD.**

MAKE SURE it is really stunned before approaching and finishing it off with more blows to provide shark steaks.

DON'T TRY this with a large shark. It could injure you and your craft. You **MUST** cut your line and sacrifice part of it for the shark's thrashing will soon attract its fellows.

PROTECTION AGAINST SHARKS:

Unless wearing a life-jacket or travelling in a craft equipped with shark repellent, the risk is great to anyone in the water, but it not a foregone conclusion that shark attack will occur.

Shark repellent may not be 100% effective but even so, only use when absolutely necessary. **REMEMBER** you can only use it once.

IN THE WATER:

If sharks are present try to **avoid** passing body wastes, which could attract the shark's interest.

If you **MUST** urinate do it short, sharp spurt and allow it to dissipate between spurts. Collect faecal matter and throw it as far away as possible.

If you vomit try to hold it in the mouth & re-swallow it (Yerk!) But if this proves impossible throw it as far away as possible.

If it is necessary to swim use strong regular strokes, **avoiding** schools of fish.

If a group of people are threatened they should bunch together and face outward. To ward off attack kick outward and punch out with a stiff arm using the heel of the hand-like a sports "hand off."

Make loud noises by slapping the water cupped hands. Put your head under the water and shout.

These measures are more effective with a group but can work even when you are alone and under attack. If you have a knife, be prepared to use it. Let the shark take it fully in the snout or go for the gills and eyes.

ON A RAFT OR BOAT:

Don't fish when sharks are around and don't throw waste overboard (including excrement and fish offal). Let go of baited hooks. Do not trail arms or legs in the water.

If a shark threatens to attack discourage it with jabs to the snout with a paddle or pole. **REMEMBER** a large shark could also take a bit out of a boat/raft. (Jaws?)

REMEMBER:

If you have shark repellent, follow manufacturer's instruction but use only if the situation is very grave.

The repellent will soon dissipate in the water and become ineffective. Choose your moment well since you can only use it once.

TURTLE NOTE:

Turtle meat is **highly nutritious** and turtle eggs are another good source of food if you are lucky enough to have turtles come ashore.

Easy to find where they laid their eggs just follow back the trail they leave as they go back to sea.

The turtles like all animals with a copious blood supply **MUST** be bled to death in order to improve the keeping quality of the meat.

This prevents it taking on the unattractive dark colour which may be observed in bruised or badly killed meat which goes bad quickly and is more difficult to dry in the sun. pix 369b

When dressing a turtle, the knife should be inserted in the soft leathery skin at the head end of the belly shell and the edge of the belly shell then followed by sawing movements of the knife until the shell has been cut right around.

The head end of the belly shell **MUST** then be undercut, for valuable layers of meat adhere to it as well as to the shoulder bones.

The joints of which may be reached by cutting out from the centre, with the blade laying flat close under the belly shell.

The shell may then be lifted off and the meat extracted in 4 main pieces if you are experienced or in many smaller pieces if you are not, and the eggs harvested if it is a female.

The heart may be eaten but the offal **MUST BE DISCARDED** as suspect especially in older turtles. The meat should then be treated as seen before.

CONCHS:

They are best removed from their shells by breaking the pointed end of the shell where the shellfish anchors itself to the shell.

A slower method is to hang the shellfish from a hook, allowing the weight of its shell to extract the fish from its protection.

This is not so effective and it is better to learn to break the shell at the spot where it anchors itself.

DANGEROUS SEA CREATURES:

These fishes and sea creatures are dangerous. Most are either poisonous to touch or have poisonous flesh. ??

RIVER DANGERS:

ELECTRIC EELS: (Electrophorus electricus)

May reach nearly 2m (7ft) long and 20cm (8in) thick, rounded, coloured olive to blackish, paler underneath. Native to Orinoco and Amazon river system of South America it often prefers shallow water where there is more oxygen.

The shock from a large one can be 500 volts, enough to knock a man off his feet. jm

PIRANHAS: (Serrasalmus)

Occur in the Orinoco, Amazon & Paraguay river system of South America. They vary in size but may be up to 50cm (20in) long and are all deep bodied and thickset, having large jaws with razor-sharp interlocking teeth.

They can be Very dangerous, particularly in the dry season when the water level is low.

If you have to cross a river where they are, it would be a good thing to throw them a dead carcass downstream from where you are about 500ft and then cross quickly while they feast. They are voracious and a shoal of them can clean a beef in a few minutes.

SEA AND RIVERS:

STINGRAYS: (Dasyatidae)

Occur inshore everywhere, but especially in warm waters and Electric rays in warm to temperate zones. Superbly camouflaged some like rocky and pebbly places they don't only hide in sand.

Play safe prod the bottom with a stick as you go. Stingrays wound can be soothed with very hot water.

If caught the fish should be stunned before it is brought aboard and the tail where the sting is housed cut off at the earliest opportunity; the wings of the **Ray make quite good eating**.

Generally fish with single spines projecting from dorsal or pectoral fins have these for protection but a painful wound can be received if they are handled carelessly.

They are a danger in shallow waters, **especially Tropical** ones, and not only on sandy shores.

Very variable, but all with the distinctive ray shape, though hard for the fisherman to spot. A few kinds occur in the rivers of **Tropical** South America and West Africa.

The freshwater stingrays rarely exceed 30cm (1foot) long. They do not occur in rivers that flow into the Pacific.

VENOMOUS spines in the tail can inflict severe, sometimes fatal injury.

RABBIT FISHES OR SPINEFEET: (Siganidae)

Occur mainly on **reefs** in the Indian and Pacific Oceans; averaging 25-30cm (10-12in); **EDIBLE** but with sharp spines in most fins. **These are said to be VENOMOUS.** Handle with care.

TANGS OR SURGEON FISHES: (Acanthuridae)

Average 20-25cm (8-10in) deep bodied small mouthed, very colourful, with lancet-like spines on the sides of the tail that **can inflict severe wounds** when it is lashed, **found in all Tropical waters**.

VENOMOUS TOAD FISHES: (Batrachoididae)

Occur in **Tropical** waters off both coasts of Central and South America. Averaging 3-4cm (7-10in) they are dull coloured and large mouthed. They lie buried in sand and have sharp, very **poisonous spines on the back**.

SCORPION FISHES OR ZEBRA FISHES: Scorpaenidae

Are found mostly on **reefs** in the **Tropical** Indian and Pacific Oceans. Averaging 30-75cm (12-30in), very variable, but usually reddish with long, wavy fin rays and spines.

A sting is intensively painful. Less potent relatives occur in the Mediterranean & Atlantic.

STONE FISHES: (Synanceia)

Occur in the **Tropical** Pacific and Indian Oceans. Reaching 40cm (16in) their drab colours and lumpy shape make them almost impossible to see.

When trodden on, dorsal spines inject venom that is **AGONISINGLY PAINFUL & IN THE WORST CASE FATAL**.

The VENOMOUS Toad fish, Stone fish & Zebra fish are Edible.

If you land one strike it on the head and handle only when completely dead, and then only with great care.

Though not **VENOMOUS**, there are other fish with **dangerous** sharp spines, which are not always easy to detect, except at close quarters.

The spines usually occur on the back but may also be on fins on the side of the fish. Even a small spine can inflict a bad prick with consequent risk of infection.

Large spines and some spiny catfish grow as large as a man are as effective as stilettos. (Daggers).

Sea urchins can also inflict painful injuries and Sea Anemones can sting.

SEA URCHINS STING REMEDY:

Pour hot wax over the wound, wait till it cools off then remove it and it will remove the needles or spikes at the same time.

WEAVER FISHES: (Trachinidae)

Tapering, dull coloured about 30cm (1foot) long, lie buried in sand off the coast of Europe south to West Africa & the Mediterranean.

VENOMOUS spines on back and fills producing disabling pain. Soothe it by applying very hot water.

POISONOUS TO EAT:

Many inshore fish, living in **reefs** and lagoons are **Poisonous to eat**. The majority are confined to the tropics but, wherever you are, be wary of eating any fish that you cannot identify.

Some fishes that are otherwise good to eat, such as the Barracuda and Snapper are **NOT EDIBLE WHEN TAKEN FROM REEFS AND LAGOONS** where they will have absorbed **poisonous** substances with their own food.

THE MOST POISONOUS KINDS such as Puffer fish, usually have rounded bodies with hard, shell like skins covered in bony plates and spines.

They also commonly have parrot-like mouths, small gills openings and either lack pelvic fins or have only a small one.

PORCUPINE FISHES: (Diasontidae)

Occur in all shallow **Tropical** waters. Variable, reaching 50-60cm (20-24in), but when alarmed all inflate into a very spiny ball. **Their flesh is poisonous.**

PUFFER FISHES: (Tetraodontidae)

Occur in all **Tropical** and many warmer temperate waters, a few kinds in rivers in Southeast Asia and **Tropical** Africa.

Stout bodied, rounded 15-75cm (6-30in) long, most kinds with spines; when alarmed they puff up into a ball. **Their blood, liver and gonads are poisonous;** 28mg (1oz) can kill.

TRIGGER FISHES: (Balistridae)

Occur in large variety, mostly in shallow **Tropical** seas. Deep bodied, compressed, usually under 60cm (24in) with very large, stout dorsal spines.

Many kinds are poisonous to eat. Avoid them all.

OTHER SEA CREATURES:

PORTUGUESE MAN OF WAR:

EXTREMELY DANGEROUS!

(Physalis physalis)

Looks like a jelly fish but is not a jellyfish but a colony of hydroid, or polyps. It is mainly **Subtropical** but common in the Gulf Stream which may take to British shores. Southern currents carry it for example to New Zealand.

The floating bladder may be only 15cm (6in) long, but the tentacles which carry stinging cells can stream out for 12m (40ft). It stings may cause irritations for several days, they are rarely fatal so treat like a jellyfish. **Not fatal but enough to incapacitate.**

THE COMMON JELLYFISH: (Aurelia aurita)

A milky saucer-shape with purplish horseshoe marks inside, it is not **dangerous** to humans but many others are. They are often swept inshore after a storm. Some especially in the **Tropics sting severely.**

The Sea wasp or Box Jellies of Northern Australia beaches are the **most dangerous.**

Shaped with a cube shaped bell 25cm (10in) long and clusters of tentacles at the corners up to 9m (30feet) long.

In big doses venom can be fatal. **Avoid** all jellyfish streamers-even when washed up on the beach.

Almost transparent and difficult to see each tentacle is armed with millions of stinging cells.

Although their venom is one of the most deadly known and high concentrations cause skin lesions and **death**, usually only a very high dose is fatal to human.

Some jellyfish are not venomous but **beware**-size is not an indication of their potency.

If stung do not pull the tentacles off or wipe away the slime with your hand you will only get stung more.

Use seaweed, cloth etc. to wipe the sting with sand.

BLUE-RINGED OCTOPUS:

(Hapalochlaena lunulata)

Small, sometimes only fist-sized, found off eastern Australia, particularly around the Great Barrier Reef, is greyish white with iridescent ring-like markings.

VERY DANGEROUS, POTENTIALLY LETHAL BITE if trodden on or handled. Treat all **Tropical** reef Octopus with caution.

CONE SHELLS: (Conidae)

LETHAL DO NOT TOUCH!

Subtropical and **Tropical** gastropods, have a **VENOMOUS** harpoon like barb. All are cone shape but shell patterns may be obscured by a membrane.

SOME VERY POISONOUS, a few in the Indo-Pacific,

AUGERS OR TEREBRA SHELLS: (Terebridae)

Temperate and **Tropical** seas, particularly the Indo Pacific also have a stinging barb. They are much thinner and longer than cone shells. **The sting is not as serious as the cones but DO NOT EAT.**

SEASHORES & FOOD:

Most of seashore offers abundant sources of food and excellent prospects for survival.

Even where they appear bleak and barren there is food to be had. Coastal waters are the home of many life forms-seaweeds, fish, seals, birds, mollusc and the plankton that supports the marine animals.

Inland lakes & waterways of all kinds will also teem with life, except for the Dead Sea and other areas of extreme salination and those heavily polluted by man. Unfortunately this is an increasing fact.

Coasts can range from sheer cliffs to long and gently sloping beaches. From the sea a towering cliff offers no opportunity to escape the water.

Even a stretch of beach at its foot is likely to be cut off by high tide in tidal waters, though it could offer a few hours of respite before swimming off to find another landing place.

All kinds of shore, however, offer resources to exploit and there are few better places to be stranded.

SANDY BEACHES & FOOD:

Sandy shores tend to be gentle and sloping. The tide goes out a long way, exposing large areas which are the habitat of burrowing species, left below the sand when the water recedes.

They include many worms and mollusc and they also attract feeding birds. Look for signs of buried mollusc.

It is usually easier to spot the marks left by the siphons of buried bivalves under the shallow water at the sea's edge.

Where the sand is not inundated by the tide and is blown into dunes, it may be possible to find fresh water and it is here that plants will grow. Sand is easily blown by the wind & gets into everything

AVOID DUNES:

Dunes also tend to be full of aggravating insects- so do not choose them for making camp or building shelter, if you can move beyond.

MUDDY SHORES & ESTUARIES:

Where a slow-moving river joins the sea it deposits sediment, rich in nutrients, forming large mud flats. These can support many species of worms and mollusc and provide a rich feeding ground for birds and animals.

ROCKY SHORES & FOOD:

If their cliffs are not too sheer, trap pools of water when the tides recede. These pools may teem with life.

Rocks form a strata to which the many univalve shells can cling, an anchor for weed and sea urchins and crevices where octopus and other cephalopods can live.

Soft rocks, such as chalk, marl and limestone's, erode quickly and their surfaces are smooth, but hard rocks fracture in chunks and provide good nesting sides for birds.

PEBBLE BEACHES:

Stretches of pebble beach, often found between sandy and rocky sections of the shore, sustain least life. The continual movement of pebbles makes a difficult habitat for most plants and animals.

TIDES:

Tides vary considerably according to both location and times of the year for they are caused by the counter gravity's of the sun and moon. In enclosed seas, such as the Mediterranean, they range over only a few metres.

The Bay of Fundy, between Nova Scotia and New Brunswick, has a difference of 16m (53ft) between low tide & high tide.

A line of debris along the beach; a change in appearance and texture from the long dry sand to that which is daily inundated weed, shells and colour changes on vertical rock faces.

All these will help to indicate the level to which the water is likely to rise.

ALWAYS CHECK ACCESS TO & FROM A BEACH OR ROCKY SHORE:

Keep an eye on the rising water level so that you do not run the risk of being cut off.

Tides not only scour the beach but throw up valuable flotsam and jetsam, often providing fuel for fires, and may leave large fish stranded in rock pools along with their usual inhabitants.

SHORE SAFETY:

1) **NEVER** underestimate the power and danger of the sea.

Time the tides and become familiar with their pattern, then you will be less likely to be cut off by an incoming tide or swept out by the ebb. It's easy to be caught, when someone is way offshore.

2) Cliffs offer problems of access. If there is only one way down **MAKE SURE** you can get back to it.

3) **Look out for strong curreants**, especially off headlands. Sand banks are submerged rocks are also **dangerous**.

UNDERTOW WARNING:

WHERE A BEACH FALLS STEEPLY INTO DEEP WATER THERE WILL BE A STRONG UNDERTOW.

If you are forced to enter water to rescue someone or retrieve kit, have a safety line around the waist & someone anchoring you on shore- or tie the line to a firm anchor.

SWIMMING & UNDERTOW:

If caught in the undertow of a large wave, push off the bottom & swim to the surface.

Swim to shore in the trough between waves. When the next large wave comes, face it & submerge. Let it pass & swim in the next through shorewards

When fishing or swimming stay within your depth, if you are not a strong swimmer. Watch out for large waves which can knock you off your feet and carry you farther out.

If this happens do not panic. People tend to panic when they do not know how deep water is, but are reassured when they do.

It does not really matter for you can drown in 10cm of water as effectively as in 10 metres.

If you want to test the depth place your arms above head point your toes and dive feet first.. It may not be as deep as you thought.

IF A STRONG CURRENT FORCES YOU OFF SHORE, DO NOT FIGHT AGAINST IT YOU WILL LOOSE. SWIM ACROSS IT.

Using side stroke and make for land further along the coast.

Side stroke is not the strongest or fastest stroke but it is the LEAST TIRING.

If in the sea and being swept on to rocks, face shorewards and adopt a sitting position with your feet in front.

They will absorb the initial shock and enable you to grab hold and scramble ashore. This is also useful for exploring water that may conceal hidden rocks.

Keep your shoes on & at least one layer of clothing.

FLOATING:

A relaxed body floats best. So try to stay calm. It is difficult to sink in salt water. The main danger is swallowing salt water and choking on the vomit.

Women are more buoyant than men (they have an extra layer of fat) & float naturally on their backs. Men float naturally face down. But don't forget to lift your head out to breath!

FRESH WATER & COAST:

Fresh water along the coast is **best obtained** from small river outlets. Large rivers tend to be full of silt and may be polluted by industry or other human activity upriver.

On sandy shores with no freshwater outlets there may be pools among dunes. Digging above the high water mark on any beach especially if there is vegetation, may bring results.

Dig down until you reach moist sand. Let water accumulate. Fresh water floats on top of salt. Scoop the lighter layer off the top.

Rock pools are unlikely to be freshwater. Even above the high water mark, they may be the result of wave splash.

But you can sometimes identify fresh water by the growth for green #algues# which is not grazed by mollusc, as it would be elsewhere on the beach.

Saltwater mollusc cannot survive in the reduce salinity

LOOK FOR WATER TRICKLING THROUGH ROCK FACES, ESPECIALLY where there are ferns or mosses growing out of them, it will be drinkable.

If stranded on a rocky outcrop off the shore, the only reliable source of water will be the sea itself- but **NEVER** drink sea water without distilling it.

(Note: See the experiment on salt water done by Dr Bombard on sea water).

Usually far from quenching your thirst it will take valuable body fluids away from the **vital** organs & eventually cause kidneys to pack up.

Salt water can be used for cooking-but do not eat until you have an adequate supply of fresh water. The residue of salt from distilled sea water for preserving meat and fish.

FOOD:

Seashore plants will differ according to the climate, but they will be available when weather or tide prevents you gathering food from the sea.

In the water you will find seawater of one kind or another where there is rock to give them purchase and water shallow enough to allow to reach them.

SEAWEED (CALLED CORRECTLY ALGAE) ARE VERY VALUABLE AS FOOD:

In many parts of the world they form a major part of the diet and many are considered a delicacy from the cuisine of Japan to the laver bread of Wales. Seaweeds can be dried & stored for months.

WARNING WARNING:

Seaweeds are a valuable contribution to diet. But do **NOT EAT THE BLUE-GREEN ALGAE** sometimes found on freshwater pools. **It is Very poisonous.**

SEAFOOD on COAST WHEN & WHERE:

ON MOST COASTS THE BEST TIME TO FISH FROM THE SHORE IS ABOUT 2 HOURS AFTER HIGH TIDE WATER.

THE BEST HUNTING FOR FISH & MOLLUSC WILL BE AT LOW TIDE, when rock pools can be inspected and buried mollusc & other creatures dug from sandy shores.

Bivalves which feed by filtering water through their digestive systems, can build up **dangerous** concentration of **toxic** chemicals in areas polluted by industry or sewage.

In Tropical zones mussels are poisonous during the summer especially when seas are reddish or highly phosphorescent.

In the Arctic black Mussels can be **poisonous** at any time of the year.

CONE SHELLS:

Learn to recognise the **CONE SHELLS**, which shoot out a **poisonous** bark, in a few species potent enough to **kill** you.

There are more than 400 types of cones shell, mainly found in the tropical Indo-Pacific with about 12 species of the Southeast of USA and in the Caribbean.

They are all identified by their shape Tenebra or Auger and Turrid shells also have **poison darts**.

Their venom is not **dangerous** to man, but a sting may be still painful.

ONLY EAT MOLLUSCS COLLECTED LIVE:

Bivalves such as oysters, clams and mussels should close tightly if tapped gently. Gastropods such as Winkles and whelks have a trap door (operculum) to close the entrance to the shell.

It should close tightly if the shell is shaken. Other gastropods such as limpets and Abalone have no operculum but are tightly anchored to rocks.

Use a knife under the edge of the shell to prise them. If **they are hard to dislodge they are good to eat**. If they come off easily they are probably dead or sick.

After high tide any Limpet found still fastened is good food the tide washes away sick or dead specimens. Cook shell foods by plunging them into boiling water and boiling for **at least** 10 minutes.

If you eat shell foods raw you expose yourself to parasites and pollutants which they may carry **especially** close to civilization.

FISHING:

Fish and sea snakes require more catching. Some fish are **dangerous & ALL SEA SNAKES ARE VENOMOUS**.

Distinguish snakes from eels by their scales and their broad flattened tails. They are said not to bite swimmers.

Bites usually occur & then only rarely, when fishermen are removing fish from nets in which snakes are also caught.

ON MOST COASTS THE BEST TIME TO FISH FROM THE SHORE IS ABOUT 2 HOURS AFTER HIGH TIDE WATER.

If you fish when the tide is still coming in you are constantly retreating and probably getting wet. **REMEMBER** that salt water will rot boots and clothing.

Sea fishing requires a larger hook than freshwater fishing. A wide variety of bait can be used. (Fishermen from Eastern coast successfully use bright skip rope around their hooks!)

Limpets for instances can often be found clinging to rocks or lugworms (Arenicola) can be dug up on sandy & muddy beaches. At low tide look for the coiled worm cast that shows you where their L shaped burrows are.

Make use of the tide to help you catch fish by building large arrow shape taps from stakes or rocks. Point them away from the shore. Fish will be caught when the tides recede.

OCTOPUS AND SQUID:

Octopus can be hunted at night, when they are in search of their own prey. Attract them with a light, then spear them.

In daytime empty shells around a hole is an indication that an octopus may live inside. Drop in a baited hook, wait until it is taken & pull sharply up.

The best way to kill an octopus is to turn it inside out: place a hand inside the fleshy hood, grab the innards and pull hard. Try it on a small octopus first.

It takes practice so until you are proficient stab the Octopus between the eyes or bang it against a rock. All Octopus have a hard parrot like beak, and a few can give **poisonous** bite.

The worst is the Blue Ringed Octopus of Australia, its venom can be lethal. Avoid it.

Octopus flesh is tough but chewy and **Very nourishing**. Pounding it will help make it more tender. Boil the body and roast the smaller tentacles.

In the open sea squid can be huge but a few small squid occur inshore. Look for them in rock pools attached to seaweed.

Catch them at night with a bright light by jigging. Cuttlefish do not come close inshore but can be caught at sea in the same way.

ECHINODERMS:

Another useful source of food, the echinoderms include the starfish (not worth bothering with as food), the sea urchins and the sea cucumbers. Sea cucumbers creep about the seabed or burrow in the sand.

They look like warty black cucumbers up to 20cm (8in) long. They are also spiky white sea Gherkins and Worm Cucumbers (which burrows in the sand). **Sea cucumbers should be boiled for 5 minutes before eating.**

Sea urchins or sea eggs as they are often called are usually prickly balls which cling on to rocks, just below the low water mark but they have burrowing relations, the cake and heart urchins and the sea potato which can be found beneath the sand.

Split open and eat the egg like yolk inside. You can it **RAW** but it is safer to boil.

Avoid any if their spines do not move when touched or if they smell badly when opened.

SEA URCHINS:

Handle carefully, their spines can inflict a painful wound especially if you tread on them with bare feet.

If you get pricked and the spine breaks off, don't try to squeeze it out it my push the spine in deeper.

With luck spines will begin to work their way out of the skin after a few days.

FIRST-AID:

According to some folk medicine, to remove them apply hot wax on the wound and when the wax is cooled of, just rip the wax of which will remove the spikes at the same time,

It is worth the try if you have wax and no medical facility around.

CRUSTACEANS:

These includes the Crabs, Shrimp, Prawns, all of which make their home in rock pools.

Lobsters are usually found beyond the tidal zone but can sometimes be found in deep pools or crevices.

Look under stones and seaweeds.-though you'll have to be quick to catch them! A net would help. Improvise one from clothing and a piece of wire or a sapling.

Sand Crabs are abundant in the Tropics. Active at night they can be chased back to their burrows at the top of the beach and dug out.

Some even climb trees and can be knocked down. Freshwater Crabs, Crayfish and Shrimps are also found in many parts of the world. They are smaller and usually found in shallow water.

ALL CRUSTACEANS SPOIL QUICKLY, and they may contain harmful parasites.

They MUST be eaten as soon as possible, so keep them alive in water until you are ready to cook them.

They are cooked alive-either by plunging them in boiling water so that they die almost instantly or by putting them in cold water and heating it up which is claimed to lull them to unconsciousness so that they feel no pain.

Boil for 20 minutes, use sea water to do so and you don't need much water either.

Crabs have poisonous sections which MUST be removed. Twist off the claws and legs then with the crab on its back, place your thumbs under the flap at the tail and push upwards. Pull the flap up and away from the body and lift it off.

This prevents the stomach contents from touching the flesh. Next press on the mouth with the thumbs pushing down and upwards.

This makes mouth and stomachs come away in one piece. The **lungs** (known as dead men fingers) which **are harmful** to eat can then be pulled out and discarded.

LOBSTERS:

Lobster is easier to prepare. Once cooked it becomes red. Break the claws and use a rock or stick to break the shell.

As for the tail or body simply crush them with your hand or use a stick if you are very weak, then pry open ready to eat.

Some may object that the green stuff inside is no good but **it can be eaten safely** as for the tiny legs on the side break them off & suck on them.

DANGERS ON THE SHORES:

Unless you are very still water higher than your thighs will be too murky to see through. You will risk stepping on something unpleasant and waves should sweep you onto rocks or coral.

Wear shoes when foraging in water. You need soles if you are improvising foot coverings. Cloth wrapping is **NOT** enough to protect from spines or corals.

WEAVERFISH:

Lie buried in the sand off the shore of Europe, West Africa and the Mediterranean. **Their spines are VENOMOUS.** Apply hot water to soothe spine wounds

MORAY EELS:

May be found in shallow water. They have a savage bite and guard their holes tenaciously.

Keep clear of any you see and do NOT put your hands into crevices.

GIANT CLAMS:

On Tropical reefs can be big enough to trap a limb if they snap shut on it.

FISH WITH VENOMOUS SPINES:

Often live in very shallow waters. Most common and **most dangerous** in Tropics, a few occur in temperate waters.

Bottom dwelling kinds are almost impossible to detect & are often superbly camouflaged

Zebra fish are easier to see but equally **dangerous** to contact. Use a stick to stir up the sand & rocks in front of you.

CORALS & DANGER:

Corals are sharp and can easily cut you. Some such as the fire coral sting on contact.

ALWAYS APPROACH A REEF WITH CAUTION.

Exploit other sites or food first. Both the reef and its inhabitants which may include cone shells can represent.

SHARKS:

Although most sharks feed mainly in deep waters some species frequent shallow waters and swim up the rivers and any might come onshore looking for an easy meal.

Most sharks attacks on human occur in very shallow water. **BE WATCHFUL.**

LAGOONS & WARNING:

Reefs are often formed around tropical islands or out from the shore. Making a breakwater which leaves still waters in a lagoon.

FISH IN A LAGOON ARE OFTEN OF THE POISONOUS VARIETIES.

Barracuda and red Snapper which are edible in the open sea **MUST be avoided if caught in a lagoon.**

Their eating habits cause them to become **toxic**. Fish from the reef on the seaward side.

ISLANDS & SURVIVAL:

Islands offer a special challenge to the survivor, especially small islands and those lacking resources. The feeling of loneliness is emphasized on an island and the sense of isolation acute.

The problems are mental as well as physical. To help overcome them explore the island thoroughly and establish a daily routine.

Climb the highest point to make a sketch of the island and get a mental picture of the terrain. Explore every creek, cranny, bay and beach of the coastline.

Then take your reconnaissance inland until the island is familiar. You are the new Crusoe! Wait for Friday she might come to give you one heck of a weekend!

The island may have been inhabited in the past-remains of building offer a basis for shelter. Fence posts and wires will be useful to repair your boat or build a raft.

Vegetables may still be found growing & rats seem to follow man everywhere sometimes they are the only permanent wildlife to be found.

Shelter will make life seem better and eve a scrape in the ground will give some protection. If you find caves **MAKE SURE** that they are not tidal before you decide to use one.

REMEMBER that even caves that seem safe may be flooded or cut off by spring tides which are higher than normal.

On a barren rocky outcrop shelter may simply mean finding a place out of the wind. Water may depend upon collecting rainfall and distillation.

Food will be whatever clings to the rocks, birds, & birds's eggs if you are lucky and what you can haul from the sea.

RESOURCES:

On any small island resource will be limited. Take care not to over exploit any one of them. Water is often a problem. Lack of it is the reason many islands are inhabited.

Lush vegetation will draw attention to springs and streams. Digging above the high water mark may produce water. Catch and store rainwater.

To desalinate seawater by distillation you need a lot of fuel which may be scarce.

Driftwood may be available and some seaweed will burn when dried- but you need wood to get the fire going.

Seal blubber also makes good fuel. Have a fire only when you really need one. Search beaches after every high tide-not just for wood.

Everything has a use to the survivor. Once familiar with your island, do not be afraid to venture out at night when more creatures can be seen and foraging may be more rewarding.

COCONUTS:

Tropical islands are rarely desert islands. They will usually offer plenty to eat, both ashore and in the water.

The coconut palm is found right through the tropics and subtropics and can provide fronds for shelter, husks for ropes, growing points which taste like cabbage, the milk & meat and the shell which you may use as cups & containers.

To remove the fibrous husk around the coconut force it over a sharpened stake or split it with a hand axe. see pix?

Extract the milk by piercing one of the dark eye of the nut itself before smashing the nut open to get the milk.

CAUTION:

Coconut milk is safe to drink & refreshing drink -a large nut hold 1 litre (2pt). **Do NOT drink from very young green** or old dark brown nuts, their liquid will give you diarrhoea. The meat itself is indigestible in large amounts, **eat only a little at a time.**

COCONUT EXTRACTION:

Extract coconut oil by exposing chopped white meat to heat, sun or fire & collecting oil as it runs off, or by boiling and skimming the oil as it rises to the surface.

Rub it on to protect from sunburn and chaffing from salt water, to repel insects as a salve for sores & blisters or mixed with wood ash, as a substitute for soap.

COCONUT OIL RUBBED ON YOUR BODY IS VERY GOOD WHEN FISHING TO PROTECT YOUR SKIN FROM SALTED WATER.

CLIMBING UP PALMS:

If coconuts don't fall on your head and you can't knock them down or if you need to reach some high bananas don't try to climb tree trunk like a rope.

Instead, tie a strong bandage of cloth into a strap & slip it around your ankles.

Adjust it to hold your feet close to the trunk & then you can press the soles of your feet inward & grip with them.

ATTRACTING RESCUE:

- 1) Lay out signals to attract searchers by arranging rocks, seaweed anything that contrasts with its surroundings.
- 2) Sand is excellent for polishing metal to make mirrors to signal with.
- 3) Set signal fires ready to light the moment searchers or possible rescue are sighted.

MOVING ON:

In a group of islands, you may be able to move on to another when the first's resources are exhausted. In warmer climates it may be possible to swim but build a raft in cold climate. (See raft #?)

If there is nothing to build a raft from, make some kind of flotation aid even if it is only temporary and empty box or coconuts.

SEALS:

If there are seals on your island you could use them to make a raft. From autumn through to spring, when the seal stores a lot of fat in its body, a seal carcass will float. If several are lashed together they will support your weight.

TIDES TO STUDY:

Study tides and currents between islands **carefully, they can be treacherous.**

Float something you can observe and note its progress. Time your swim so that the ebb takes you out from your island and the high tide takes you in to the new island.

BEST SIGNAL INSTRUMENT:

Beside the whistle, the **best, simplest and most effective** and cheapest article of life saving equipment is **the signalling mirror**.

It is quite like a pocket mirror but has besides a small sight hole through which the missing men can sight any plane or ship so as to flash at it with the help of the sun.

Such mirrors have saved countless lives of sailors and airmen who carried them or improvised them from polished metal parts.

So effective is the flash method that the pilot of a search plane said; I noticed at once the bright patch of light someone had flashed at me, then I saw the castaways.

SEA SURVIVAL:

The sea as the polar or desert regions don't forgive & you can not afford to make One error, it could be your last.

It is normal for any castaways that his bowels go to a complete standstill from 5 days up to a recorded 39 days so don't worry and have no fear. It's better than to have the runs. No?

SOFT WATER AT SEA:

There are many accounts of sea disasters which often refers to castaways dying of thirst despite plentiful rain. When it comes they have no containers to catch it in and have to lap it up like animals.

Or if they think of catching the rain in a sail or a tarpaulin they usually forget to wash this out in the sea first so as to get rid of the salt crust and thus catches the rain water as salt free as possible.

The little salt left will not be dangerous, and it will even give rain water a better taste.

CLEAN THE DECK:

Again whether from panic or ignorance scarcely any **REMEMBER** to clean the decks of their life boats or raft getting rid of any pools of salt water so the rain that falls there generally turns at once into a dirty or brackish mixture in any case undrinkable.

DEW collected at night from the raft with your sponge will be good to collect, not much but any drops count.

SEA FOOD & SEA BIRDS:

Some castaways have developed the ability to catch by hand fishes which were swimming close to the side of their boat. Others have fed on half-digested fishes found in the belly of bigger fish they had caught.

Others have held the barrel of a pistol under water and fired. (VERY DANGEROUS IT COULD WELL EXPLODE!) The blast stunned some of the fishes swimming near by which they could then pick up without difficulties.

While the sea offers no direct substitute for salt-free fluids, it contains food in abundance for the castaways to find.

Fishes, turtles, plankton, seaweed and even water birds will often parade past him within his reach enough to sustain him for an unlimited period.

Sea birds will come roosting on your awning in the evening, just move snake like to stalk the birds then in a quick flash grab them by the legs.

Sun-dried birds taste better than raw however not quite Kentucky. However the great majority of castaways do not realize this and instead of looking for such food, they suffer agonies from hunger.

SCURVY & PLANKTON:

One of the most dreaded phenomena with the lack of food is scurvy which among other things can cause teeth to become loose. But sea water helps fighting this.

Plankton if you have a proper net to catch it will solve this problem, plankton taste good but smells bad yet it is **Very nourishing**. (Whales feed on it.)

However plankton can not be found in all seas of the world and often it comes up to the sea surface only at night, thus all the efforts to catch it during the day are lost.

PLANKTON NET:

A special net can be used but any clothes, shirts that is left trailing at the back of the raft will do the job.

SEA & TRICKS:

Castaways have made fishhooks out of all sorts of unlikely spare parts-needles and pencil clips, shoe nails and pocket knives, bones of fishes and birds and their ingenuity & (image-in-nation) was often rewarded. They have made lines from shoe laces & even thread taken from the seams of their pants.

It is amazing how much some people's talent for improvisation can be stimulated by hunger and adversity.

Some airmen crashing in the Pacific made little metal triangles out of the tops of food cans, wrapped some bait around them, put them out on a line and caught several birds. Others succeeded in shaking shrimps & other small fishes out of seaweed drifting past them.

These are only a few examples to prove the point Bombard was first to make successfully, that the sea will provide enough food for a castaway to live on indefinitely, including the necessary vitamins.

The fishes Bombard caught contained the precious proteins and fat needed by the body, plus vitamin A, D in cod liver oil, B1 and B2. The plankton contained Vitamin C and sugar.

Lindemann as Bombard too subsisted chiefly on food supplied by the sea although like Columbus he took raw onions on his Atlantic crossing as a precaution against scurvy and ate one every day.

ONIONS CONTAIN MORE VITAMINS THAN ANY OTHER VEGETABLE.

FLYING FISH ?:

(Who gave them their license?)

On flying fishes, studies were made & Stead instructors and others recommend that in case of shipwreck, in the day; to lay clothes or any clear material on the raft.

And at night to light up torches or to use a lamp or flashlight or even the reflect of the moon on a mirror. The reflected light really attracts the flying fishes.

ONE HAS JUST TO REMEMBER THAT TORCH FISHING ON LAND IS FORBIDDEN BECAUSE IT WORKS SO GOOD, YET PERMITTED FOR SURVIVORS.

After the jump the flying fishes hit the canvas and drop stunned on the deck where the castaways have only to collect them.

But instead of eating them all, they should gut them, cut them into strips and dry them on the deck in the daytime, then he can keep a store of fish over a long period also use some pieces for baiting bigger fishes.

SEA SURVIVOR EXPERIENCE:

William Willis who in 1954 crossed the Pacific on a large wooden raft covering 6,700 miles claimed afterward to have drunk about 2 pints of sea water a day but then he had periodically supplemented this with fresh water.

SOUTH SEA TRIP ON A RAFT:

La Balsa, the longest raft voyage in history was made in 1972 from Ecuador to Australia. Along their 8,600 miles route lay some of the worst weather in the world.

And the treacherous reefs sometimes hundred miles long to block their path and that could destroy them in a moment, in the mist of the worst seas in the world.

These 4 men endured 6 months on a tiny floating prison without bitter, even fatal quarrels. Their names are: Vital Alsar, Normand Tetreault, Marc Modena & Gabriel Salas.

La Balsa ranks with Kon-Tiki as one of the greatest sea adventures of all time and their trip was twice as far as the Kon-Tiki.

As Vital said so well, survival depends on the TOTAL cooperation of all men, whether their world is a raft, a village, a country or a planet.

How would 4 men live together, 24 hours a day for 6 months, in a cramped floating prison cell? They all had heard of prisoners going stir crazy, sometimes killing each other at the tiniest provocation.

Since obviously they could not expect to have been 4 perfectly stable individuals yet their own neuroses might prove to be complementary.

They needed introverts and extroverts, optimists and pessimist, romantics and realists, conservatives and liberals.

It was a mixed bag of human strength and weaknesses & **they would have to establish a modus vivendi that would minimise friction & prevent a fatal blow up.**

Thus they decided that first they should never violate each other's personal space.

Never under any circumstances touch each other. (But for a case of life or death of course).

No horseplay, no wrestling... Why if it is only playing? That's the whole point, once you have violated another man's space, even in fun, it will be easier to touch him in anger.

So they had to imagine that each one of them were surrounded by an invisible bubble of privacy that must never be shattered.

And as a second rule: THEY AGREED UPON NEVER CRITICISE EACH OTHER".

We all know that a small criticism can blow up into a fight very easily especially in such confined quarters for so long a period.

When one starts to complain about a man's eating habit or his snoring it makes no difference that you are only joking, human nature dictated that he will end up hating you.

One important thing to **REMEMBER** even though they had good charts they were warned that many reefs even some large ones have not been charted yet even in 1985.

And thousands of small ones are lying just below the surface, unseen traps that **NEVER** gets on a map.

The vast stretch of water between Samoa and Australia would be especially hazardous for a craft without radar and night sailing would be as chancy as Russian roulette. Hundred of vessels have been torn apart in this region.

Yet theirs was much planning behind all this madness. Among the many studies done through miles of naval archives and much sketches of balsa rafts which the Huancavila Indians were still sailing when the Spaniards arrived.

GUARAS:

There was a special technique which La Balsa used it was the special keel boards or GUARAS which gave the balsa raft such a control that they actually manoeuvred more effectively than the Spanish galleons. see photo/ drawing of this technic to be done

The Quite Indians following the precepts of their ancestors had advised them **NEVER to cut down a balsa tree until there is a crescent moon**, when the sap has drained from the trunk.

Such sap trees are called female, while the heavier sap filled ones are male thus we waited for a waning moon so as to find 7 female trees that would resound with a hollow thooong when slapped with the heel of the hand.

Most trees will float but balsas can be manoeuvred almost like plastic ducks in a bathtub and with hardly any effort one can lash them together with liana vines.

Those logs were then strip of their bark and are rotated to find the best pairing before being taken ashore for shaping & grooving.

Once the best marriage between the 7 logs is done then the construction can begin with the longest one in the middle which was a whoopy 42 foot long affair. Their forward ends were cut on a diagonal to form a pointed bow.

They then bound them together with thick hemp ropes, presoaked in water for added pliancy and carefully fitting the ropes into parallel grooves carved into the logs. In order to preserve the logs Marc had coated their underside with crude oil.

Now the start on the superstructure could begin. Placing 4 heavy beams laid across the base logs and firmly secured with one inch hemp.

Then a deck of split bamboo was placed across the beams creating a narrow storage spaces between the deck and the logs. The deck itself was covered with mats of woven reeds.

It was a slow and tedious work, hundred of knots had to be tied with great precision, for if only a few were carelessly tied, their raft might rip apart in mid-ocean. OOPS!

One another they would check each other knot and work to insure themselves, all were like spies and no one trusting anyone.

Even for the cabin to build especially with the roof which could come loose in high wind and would turn out to be like a second sail.

So special pains was taken with the walls of woven bamboo reeds and with the roof made from bamboo slats and tough pliable banana leaves.

In front of the cabin they erected the 30 foot mast: two poles of hard, durable mangrove woods, tied at the top to form an inverted V and on top of this was a small crow's nest.

As for the sail it was a rectangle of strong canvas, 18 feet wide and 21 feet high but there was no room for a spare sail yet they had plenty of needles & thread for repairs.

Perhaps the raft's most advantageous feature was its set of GUARAS, vertical keel boards or centre boards, each 2 foot wide and 6 to 8 feet long.

Situated between the logs, they protruded under the raft like multiple fins. 3 in V shaped formation near the bow, two under the cabin and for in straight line at the stern.

Ecuadorians fishermen who steer their balsa raft much as their ancestors did, had shown them how the GUARAS were used.

To steer the raft from left to right, we would slide the starboard (right) GUARAS deep into the water while pulling the port-side (left) GUARAS out of the water.

The most important were the GUARAS at the corners of the stern. These would have to be shifted to compensate for winds blowing from an angle.

ALTHOUGH SIMPLE THE TECHNIC IS CRUCIAL TO KEEPING A RAFT ON A STEADY COURSE.

The final addition was a tall dignified "throne" of choice balsa wood with a large hole in the seat like an old fashion privy which it was exactly the case.

This toilet was perched on a special port-side shelf hanging over the water. World's biggest flush!

They loaded their food storage made of 52 gallons of fresh water, kerosene for their small stove, gasoline to run the radio generator, extra rope, a few books, mine would have useful too, medicines and fishing gears.

In a wooden box behind the cabin they had 330 pounds of canned fruit; 220 pounds each of potatoes, green bananas and unripened oranges and 44 pounds each of flour, rice and dried beans.

Fish was to be found daily expected. They used the smaller flying fish as a bait for the more **Edible** 30 lbs dolphins, the larger ones were fried in a skillet. But although useful at night they were a nuisance often crashing in their faces. Ouch!

As the wind shift suddenly blowing from Eastern with increasing forces, they struggled to pull in the sail and are nearly swept overboard before they manage to haul it down.

As the waves grew higher pushing them forward at a break neck pace their main worry was the danger of broaching!

Twisting around broadside so that a breaker could roll us over but by manoeuvring the GUARAS they were able to keep La Balsa moving with the waves which resembled rows of foam capped mountains marching behind.

Time and again the peaks would curl forward and splash down into the trough we had just vacated. And once in a while a huge rogue wave would break the rhythm, droppings tons of water against them broadside.

Had any of these hit them a few seconds sooner, the thundering avalanche would have smashed their cabin like a straw hat.

Fearing this possibility they stayed outside, clinging to the crossbeams while the raft pitched, yawed, reeled and spun around like a match-stick in a whirlpool.

Fortunately they had left the GUARAS in the proper positions and their steering worked by itself, for the waves blinded them & incapacitated them completely. Then the storm stopped. Ouff! Thank God!

One week after leaving the coast of Ecuador they reached the Humboldt Current, that broad cold mass of water that sweeps North from the Antarctic, runs along the coast of Chile and Peru then veers North-west across the Pacific just below the equator.

Sala check the water temperature and found it too be much colder than he had expected. The water was also a deeper, richer green indicating an abundance of plankton.

The drifting forms of marine life ranging in size from micro organism to jelly fish, which moves along with the sea currants and provides food for fish and other larger marine bodies eg: whales.

Since they were riding the Humboldt well past the Galapagos they would be assured of a steady supply of fresh fish.

Halfway to the Galapagos they began shedding their clothes for 2 reasons the constant washing over them and frequent rain was the realisation that they would not be completely dry till the end of the journey.

And the blistering hot sun as second reason brought them down to skimpy loin cloth. The 115 degree heat would make the cabin feel like the inside of a boiling teakettle.

But when disappeared and the nights wind blew, the temperature would drop 50- 60 degrees in a few hours.

So we would be shivering in the sudden chill and all we cold do was wrap ourselves in damp clothes and blankets and huddle inside the cabin.

We also had the same rule as Kon-tiki meaning that who ever was on deck had to have a safety line tied to himself.

SPEED CONTROL:

We were moving at a slow even pace which we could gauge by tossing slivers of banana leaves into the water and then counting the seconds it took for the raft to pass them.

If it took us 10 seconds to pass the marker, our 42 foot raft would be moving 84 yards per minute, thus covering approximately 3 miles per hour or **72 miles per day**.

In an effort to **avoid** the treacherous currents south of the Galapagos, we pulled in the sail and lashed down our GUARAS hoping they would hold us to westerly path.

The winds and currents had pushed our last attempt with the Pacifica into the treacherous eddies north of the Galapagos.

Round and round we had gone, imprisoned in a huge loop of contrary currents and erratic winds, unable to get back to the westward swing of the Humboldt current.

Days and weeks, finally months had passed with no ship coming near us, we were saved by a miraculous ship 2 hours before the Pacifica had sunk.

By the grace of God and strong southeastern winds, they managed to skirt the Galapagos without being snared in the treacherous crosscurrent.

One day during a lapse in conversation Vital became aware of a continuous groaning and creaking in the raft under us, the deck, the crossbeams, the mast, the cabin, the GUARAS were constantly straining against the ropes.

No raft built with inflexible nails and screws could have lasted very long on these waters. Would our ropes withstand the ceaseless friction?

The next morning Vital examined a few and was relieved to find they were in excellent shape. The balsa wood showed no signs of excessive wear and he detected no shredding of the sail.

RETREAT POINT:

When our nerves reached a breaking point because of one member's actions the best thing to do was to sneak off to one's own favourite retreat and brood until his pent-up emotions gradually subsided.

Each one of them had its own retreat spot where no one would bother them. The time they spent there would vary from 1/2 hour to several hours.

SHARKS:

Vital was most concerned about sharks' bites because of the sharks' constant presence. Toss an empty can from the raft and one was there to snatch it.

A piece of wood or paper- another shark. They were more **menacing either very early or late in the day**, when their bellies were empty.

During the voyage we harpooned about one hundred sharks to keep them from scaring away the fish that followed us. Those fishes were our natural larder.

MIRAGES:

Vital had fever for several days and at times had hallucinations which is common among sailors who have fever. So watch for those fevers.

In the few days of calm they had much time to study the amazing variety of marine life around them.

They were especially fascinated by the bright phosphorescence of the plankton which at night turned the sea into a vast bed of glowing embers and streaks of fire.

The embers were actually tiny shrimps and barnacles and the streaks of fire were tuna diving under the raft.

But the most spectacular mirages were the strange whirling coils of flames we saw skimming the surface 2 or 300 yards away which turned out to be Dorados chasing each other in circles.

The daylight hours were equally absorbing though less dramatic. All kinds of fish and mollusc constantly swam or floated around them, washing on board with high waves.

"July 14: We covered 132 miles yesterday, 5 1/2 miles per hour for a 24 hour stretch. The current is very strong and the wind from the East.

My sickness has almost gone. Marc has just checked the food supply and we have very little left - maybe not enough to reach Samoa. We shall have to live on nothing but fish or perhaps soups made from plankton."

"July 17: Good fishing. Hundreds of flying fish, with dolphins chasing them. Also a lot of tuna and sharks. The playful dolphins were around us almost constantly.

They seemed extremely social and gregarious, usually travelling in groups of 7 or 8, swimming side by side in perfect harmony.

They communicated in a language of squeaks & whistles, which we often heard as they circled the raft, leaping over the waves in unison like chorus girls.

Often called the littlest whale, the dolphin is perhaps the most approachable of all sea animals but for that very reason he is also the most vulnerable. They were so trusting that we were almost reluctant to catch them"

"July 19: On a raft you really get the feeling of the sea, a feeling you can **NEVER** have on a ship, because you are on the sea itself, in close contact with it. You can feel the currents, the changes of temperature.

Sometimes you can actually see the fingers of a new current rippling toward you, often at a speed of 10 knots or more.

The water temperature sometimes change abruptly particularly near the equator from 25 to 35 degrees in seconds."

Vital was convinced that one **MUST** become a part of nature to feel nature. You **MUST** become one with the sea, one with the fish.

The sea is like a woman, soft, wild, sweet, moody. You can **NEVER** understand these changes of mood.

It's like your first love, pure and virgin, stormy and turbulent. **ALWAYS** testing you and confounding you.

If you want to conquer the sea, you **MUST** first prove that you are really strong. She will push you to the limit but if you come through, she will open her arms and protect you.

July 30: Today we pass 142.05 W the longitude of the Kon-Tiki's final landing on Ranoia Reef after its 4,300 mile voyage from Peru.

La Balsa has taken 62 days compared with Kon-Tiki 101 days and we are passing Ranoia 1,000 miles to the North.

It would be false modesty to minimise the pride we felt in having duplicated Thor Heyerdahl's historical voyage on the Kon-Tiki. But now we faced the most difficult part of our journey the treacherous expanse of the South Seas.

Almost every sailor who has travelled the Pacific has his own story to tell of the passage through the Samoa Islands, the Fijis, the New Hebrides, and Saumarez Reefs.

There are hundreds of reef barriers, most of them uncharted and hurricanes and cyclones that have made matchwood of many a ship.

Here then was the real test. We wanted to prove that the Incas and Huancavilcas could have navigated these waters, some of the most difficult in the world, on balsa rafts like ours. "The Kon-Tiki started to fall apart about here said Gabriel, how can we be sure about this raft?"

They decided to have a look at the logs. 3 hours later after carefully puncturing each one below water level and examining bits of balsa from inside, we were happily assured that they were in excellent shape, having absorbed almost no water.

PSYCHOLOGY ON RAFT:

As dangerous as any reef or hurricane were the boredom and personal tensions of their crew.

It was inevitable that they would become restless and edgy, repeating the same monotonous routine day after day.

There were days when nothing seemed to go well, when the crack & rasp of Gabriel's spoon due to pent up tension was more grating than ever and even Norman's quiet nature made Vital uneasy.

On such days they stayed clear of each other, consciously expanding their bubbles of privacy.

FRESH WATER:

Another problem was fresh water. Marc had told them that their own supplies would probably run out before they reached Australia. They would have to chew Raw fish to quench their thirst.

Vital owns reading about the Huancavilcas and Incas had reassured him on this point.

FRESH WATER AT SEA:

Aside from chewing raw fish, they would squeeze the moisture from pieces of fish by twisting them in strips of cloth. They would also extract juices from the lymphatic glands of larger fish like Dorados and Tuna.

When they tried it they found the taste to be terrible but the percentage of salt was so low that their thirst quickly vanished in spite of the acid taste.

Of course they needed a certain amount of salt in their diet, so Marc provided them with **salt tablets**, which they took especially on hot days when the temperature would rise to 115 degrees in the cabin and perspiration drained their bodies of salt.

They would also occasionally add salt water to their regular drinking water in a ratio of one to five.

Of course it tastes a bit awful which is why the Incas used to chew on Coca's leaves. They had found that cocaine kills the taste of anything.

SEA-BATH:

Laying on the rear deck and having the waves washing over them. Grabbing a rope looped around a crossbeam to keep from being swept off the raft. The water was cool and refreshing but their bodies were **ALWAYS** left with a residue of itchy salt.

FAITH ABOARD:

After a strong storm Vital came to the conclusion that most sailors even those who pride themselves on being tough, hard drinking womanizers have a streak of piety in them.

Facing the elements of nature day after day, they must inevitably question the reasons behind those gigantic forces which for the landlubber are simply lines on a map on a TV forecast.

LOG BOOK AUGUST:

Both the winds and the currents were sluggish during the rest of that first week of August but they made some progress to the West.

At noon on August 25 Vital took a reading on his sextant and found that they were passing the 160th meridian, 2/3 of the way toward their goal.

On this trackless, signless sea it was just another invisible milestone, but to them it had a special meaning, an almost metaphysical significance. They were beating the odds, doing what everybody thought was impossible.

Several hours later Vital decided to inspect the logs again. He was particularly concerned about the possible absorption of water through the grooves they had made for the ropes.

Leaning over the port-side log, he studied a groove just below the water level. It was soft and foam-rubbery around the edges, but when he pressed it with his thumb, the wood yielded only half an inch. Not bad, he thought.

To make sure he carefully punctured it with an ice pick and brought out several tiny particles of balsa wood.

They looked dry-fluffy white and dry as sawdust. A check on the other 6 logs yielded the same results. The ropes were in equally good condition.

This favourable diagnosis of La Balsa's health gave their morale a considerable boost. They sang more, joked more and ate more.

Even the winds & currents were in their favour, propelling them in a south-westerly direction at an average of 130 miles a day.

The islands of Samoa were not far off, prompting one of them to speculate about the women they might see. "**Once a sailor ALWAYS a sail-her**"

RADIO SIGNAL PROBLEMS:

"Listen to that beautiful static Gabriel said. A moment later they hear the half garbled voice of Admiral Fernandez, "Are you listening, we have been trying to contact you for two days. Your voice was cut off on Wednesday.

Now I am getting a clicking sound from your transmitter" Vital shouted in the microphone but apparently all he heard was the clicking.

"If you hear me said Fernandez, disconnect the main transmitter coil and use it like a telegrapher's contact signal."

Vital followed the instructions, holding the tip of the coil close to the contact screw, waiting for his next order.

"OK, you apparently hear me, now **REMEMBER** that a long click is "yes" and 2 short click is "no". This is how they managed to keep contact, it was tedious but it worked.

Too bad that they had not taken Morse code course but somehow they managed well even though it was a slow process.

MORE LOG NOTES:

On Sept. 18 they finally got a spell of good weather enabling them to get a fix on their latitude and longitude.

The storm had been pushing them Northwest toward an area clotted with banks but apparently they had skirted Pasco Bank on the night of Sept. 15. Now they were safely bypassing Isabella bank, another treacherous reef.

They wanted to come down as close as they could to the northern coasts of Vanua Levu and Vita Levu, two of the principal Fiji Islands, then head south, and finally west, so as to pass south of New Caledonia.

Their intention was to avoid the New Hebrides a chain of volcanic islands between the Fijis and New Caledonia, some 400 miles long and a nightmare even for vessels with sophisticated navigation instruments.

There would be fewer islands and reefs this way and they would also miss Australia's famous Great Barrier Reef.

They now had been some 15 weeks on the high seas and had acquired a new kind of courage, the cool tested by fire courage of the seasoned matador as opposed to the defiant courage of the young novillero who is still trying to convince himself that he is not afraid of the bulls.

So like good matadors they were trying to maintain that "grace under pressure".

SEPT. 23:

"We had come down a few degrees in latitude, but not enough. A rather stiff current pushes us west. The navigation chart indicates this current goes south at 1/2 a knot but for us it is going west at 2 1/2 knots."

OCT. 1:

"To clear the southern tip of New Caledonia we would need a course of 200 degrees and to do this we needed a wind from the east of north east & not the south wind that blows today.

On Oct. 5th they realised that they would not be able to pass south of New Caledonia, so they decided to steer between the islands of Eromanga and Tana in the Southern New Hebrides.

That passage is narrow and dangerous with all kinds of uncharted reefs there as the map told them.

Fortunately they passed it through the night without any problem and later on in the afternoon of the following day they skirted the northern fringe of the famous Astrolabe Reefs.

Now they would have to go Northwest of the D'Entrecasteaux Reefs & Huon Island that ought to test their raft.

It is one of the trickiest seas in the world. Again they passed the Huon Island and their reefs during the night without incident. God was with them.

Now the wind was from the East and they could not go south as far as they would like because the current is flowing due West.

They would have liked to go almost due south to miss Chesterfield Reefs and Islands which are between 5 to 17 feet high.

For the following days no wind and dead sea caught on. The sun was unbearably hot and no fish anywhere they had disappeared long with the current. The sextant showed them that they had moved less than a mile in 24 hours.

SHELL SHOCK:

Gabriel made a note about our raft, how small it was compared to the sea all around. " I got a funny feeling, a strange sort of cold chill".

Vital answered it is called "shell shock". A soldier convinces himself that he is not scared when the bombs are exploding all around him, but the fear comes back later on.

MORE LOG NOTES:

Our raft was a good little craft and had held up through remarkably severe conditions. Nevertheless I could not help to fret about the looseness we had detected and we worried especially at night.

We could feel the logs jostling, as if the ropes were wearing away. Even the GUARAS had become slightly wobbly making it more difficult to steer through narrow passages.

Would the raft suddenly disintegrate as we were approaching the Chesterfield Reefs or would it wait till we go to the **more dangerous** Great Barrier Reef?

Lucky again they past the first Chesterfield Reefs at midnight without detecting any invisible reefs and the last ones just before dawn.

A strong wind from the East combined with a southerly current carried them in a Southwest direction.

The next few days were spent on a zig zag course through other reefs. Some not even charted, were lying just below the surface **particularly dangerous for minor craft without radar.**

CAT WEATHER RADAR:

Their cat Minet had his own developed internal radar enabling him to anticipate bad weather long before it occurred.

The sky would be clear, but suddenly he would creep into a corner of the cabin. Several hours later a squall would come, surprising everyone but Minet. My log testifies to this.

MORE NOTES:

Now they were heading for **the Great Barrier Reef, one of the most dangerous areas in the world for any kind of vessels.**

The maps showed this jagged profile of the immensely long reef, they were searching for a possible passage at high tide.

However there are no safe passage as all sailors know.

But there was a possibility seen while looking at the maps on some wavy lines on the chart. There is a current that runs south along the eastern face of the reef.

They were liable to hit the reef before seeing it. But the wind kept pushing them Westward. Having tied down everything in preparation for the crash there was nothing to do but to pray for a miracle.

They kept drifting closer to the dreaded reefs, bracing themselves for the collision, straining their eyes for the white capped lashing of waves against the invisible barrier.

They kept drifting closer and closer South with the reef on the starboard side, they were in the current. Shortly before midnight they got a fairly good wind from the North which prompted them to hoist their sail again.

OCT. 28:

By then they were clear of the Great Barrier Reef and still moving south, with the last obstacle the Saumarez Reef coming up to the Southeast where they saw the wreck of the ship Francis Blair which went down in 1942.

At 120 degrees there are some 2 huge rocks visible as shark fins and beyond them rest a foamy white line of surf breaking on the reefs.

Suddenly they realised that they were in the middle of an immense curving reef and the wind was blowing them steadily toward the deadly white lines in the distance. The rocks beneath them could be seen in the crystal clear water. They zig zag between reefs sometimes missing a coral trap by less than 3 feet.

Rushing back and forth between the 4 GUARAS behind the cabin, Vital would push down the starboard one moment, then pull them up 10 seconds later as the raft veered toward a new reef.

Meanwhile Marc would run up and down in front of the cabin, frantically adjusting the forward GUARAS to coincide with Vital manoeuvres. It was kind of split second acrobatics. Suddenly they found themselves in a pocket of reefs, they were trapped.

Luckily they found a gap barely wide enough for the raft and it was too late to turn back. Here was the supreme test of La Balsa's manoeuvrability.

Vital shifted the starboard -stern centre board to correct a slight list to the left. Then they heard a loud grinding underneath them.

A jolting crunch knocked them off their feet as the GUARAS bumped over rocks and coral. Three GUARAS broke but they were over the reefs and out into the blue water on their last lap to Australia.

PSYCHO NOTE FROM VITAL:

"I thought of the many things we had proven on this voyage. We had shown that 4 men can live on a "floating prison" for more than 5 months without succumbing to the urge to kill.

In fact by carefully adhering to our 2 rules, we had managed to avoid even a serious dispute.

A raft or boat on the high seas is really a small world in itself.

Each man is responsible for the welfare of the whole group.

SURVIVAL DEPENDS on the TOTAL COOPERATION of ALL MEN.

Whether their world is a raft, a village or a planet. La Balsa had shown that such a cooperation is possible.

Moreover we had demonstrated that it was possible to navigate a raft with considerable accuracy, that one need not drift with the caprice of winds and currents.

We had come through some of the most dangerous seas in the world and successfully manoeuvred past nine treacherous reefs at night.

We had also shown that a balsa raft of good female logs retains its buoyancy over long distances. Now at the very end of our voyages the logs sat slightly more than 1 inch deeper than they had in Guayaquil.

Had we wanted to sail the raft back to South America, I was sure that we could do so by tightening the ropes. Heehaw!

PUNCH DRUNK EFFECT:

I got off the raft and start walking on Terra Firma toward the crowd waiting for us and then suddenly before I had taken 3 or 4 steps, my legs buckled and Gabriel, Normand fell in heap beside me and Marc wobble in the arms of two men.

We were experiencing the punch drunk effect that all sailors go through when they first step on terra firma. In fact ours was worst because the motions of a small raft are more exaggerated than those of a large vessel.

Reaching my little 4 year old Denise by telephone she said: "Did you drown? She finally asked. No I am still here "Mi corazon" I said, everyone's fine". Is the kitty still there? She asked. "

Yes, Minet's still with us." "Bring him home, Daddy," she said with sudden enthusiasm. I would have promised her the moon wrapped in cellophane! Feeling a lump rising in my throat.

To a reporter who asked "Were you afraid Captain?" Quite often I said. "But I managed to hide it. Mostly from myself."

After our "heroes tour" of the major cities our hands swollen from handshakes, our jaws muscles worn out from smiling we all parted company.

We had a farewell party on the raft, a boozy, sentimental affair that lasted until dawn.

We talked about Minet our cat and about all the dangers we had overcome, laughing and hugging each other as we discussed the difficulty of keeping my two rules.

I wanted to punch you every time you cleared your throat Vital said Gabriel. "One afternoon sometime in August you cleared your throat 29 times in a single hour, I counted."

Norman spoke up about the way Gabriel had cracked and rasp, "Finally forcing me to eat outside the cabin because I could not stand it any more."

I guess I was nervous explained rather sheepishly Gabriel. "Anyway I am glad you did not criticize me. I would have stopped eating altogether if I had know how awful it sounded."

Marc grinned and shook his head. "No Gabriel, nothing could keep you from eating. I envy your stomach, my friend and also your ability to sleep when nobody else could. With that kind of gift you can survive anything."

"Thus praising and forgiving each other, we cemented a friendship that is rare- the profound comradeship of men who have travelled far and faced death together, thumbing their noses at the gods of chance. Yet still not forgetting old St. Francis"

Vital flew back home but felt imprisoned inside the huge, almost empty jet. How he longed for the freedom of La Balsa, the nearness of the pulsating water, the friendly fish trailing behind them, the satisfaction of controlling one's own destiny.

"There is nothing wrong of being afraid of roller coasters, everyone has to be afraid of something, I hear that Manolete was afraid of cat."

RAPHAEL! THE 5TH MAN OF LA BALSA:

Vital made a final trip to see Raphael Corcuera his old AM radio mentor. " Raphael is dead, he had been awfully sick for a long time but he would not let himself die until you reached Australia Senora Corcuera said".

She paused, touched her greying hair with trembling fingers, tears beaming in her brown eyes.

"Your wonderful voyage kept him alive. He seemed to be sailing with you as he charted your progress day by day. When you were in troubles he kept worrying and saying "Where are my sons?"

"We finally moved his bed down to the basement, where his radio was, he was too weak to climb up & down the stairs."

She took me down and showed me the log he had kept and the much marked map. "I felt a mingling of pride and sadness when I noticed how his writing had grown fainter toward the end."

"We loved your husband" Vital said and we always felt his presence. You might say he was the fifth man on La Balsa". "Raphael would have been proud to hear you say that" she said.

EPILOGUE:

The flowing week in Madrid, the Spanish government gave me an elaborate reception at the General Francisco Franco's ornate palace.

It was a splendid ceremony, and I was presented with a beautiful bronze medallion. But I could not help feeling a certain pity for General Franco.

Here he was, surrounded by everything money could buy, exquisite tapestries, gleaming marble floors, oriental carpets, Etruscan vases, red velvet drapes, discreet servants to answer his slightest need. Yet it seemed like a gilded prison.

He had no free access to that world that is most real to me. He could not take a solitary walk down a tree lined avenue, or eat in one of those marvellous gypsy taverns of Plaza Mayor.

Like any other head of state, he had to be escorted everywhere (**like a prisoner**) by bodyguard, having long sacrificed the precious privacy that even the most humble Spaniard or man enjoys.

The ransom of success or power is the lost of freedom, both are jail birds of a kind.

"It **MUST** have been wonderful to sail on a raft" he said to me. "How nice it would be to get away from all the humdrum problems of this world". Said Franco.

Had it been possible for him to use it, I would have given him La Balsa then and there.

Instead with his financial assistance we established a sailor's museum in Santander, my hometown and that of Columbia's map maker where La Balsa can remain on permanent display.

"Perhaps it will encourage someone else to take up the challenge of the sea as the Huancavilcas did and sail freely toward the western sun"

"Es-Perron-le" Shalom! L'hytraot! Bon Voyage!

OTHER SURVIVORS EXPERIENCE AT SEA:

"On a dinghy of 2m.40 by 1m.20 thus much smaller than the Heretic of A. Bombard they had saved from their crashes plane before it went down:

A pen knife, a pair of pliers, an automatic rusted pistol and a few metres of fishing line, they did not have any navigation instrument aboard.

They were carrying all their prejudices & prevention's as far as the sea was concerned. And they were afraid of it.

Thirst forced them to drink sea water and they were sick. But 1 of them noticed that drinking only a bit every day would lower down the thirst sensation.

They took some fishes and ate them raw, then they discovered that the fish had soft water in them.

Finally they overcame their fear and familiarized themselves with the Pacific. All alone they learned to live from the sea.

They crossed 1, 500km on this dinghy without ever being attacked by the hundreds of sharks they met along the way.

Finally they reached an island where they lived as Robinson. They had passed 34 days at sea and that was before Bombard Experience.

But all the imaginative men who bring something to humanity **MUST** alas too often fight much more so against their kinsmen than against the obstacles and dangers that they want to conquer.

Yet it gives them more merit.

(TO WIN WITHOUT A FIGHT IS TO WIN WITHOUT GLORY!)