

# Sailing Course for Beginners



This electronic version has been prepared using the 1988 revised version of the original YCC "Summary of the Sailing Course" of 1969. It contains chapters on trapeze sailing and spinnaker work and a multi-language dictionary instead of the original English/French/German terminology list.

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## **1. Basic Principles**

### **1.1 Introduction**

There are two main categories of sailing boats:

- Keel boats, where stability on the water is obtained by means of a weighted keel placed under a buoyant hull. Seagoing yachts are mostly keel boats.
- Dinghies, the balance of which is regulated by weight of the crew. These rather small boats are ideal for lake sailing.

We shall limit ourselves here to the study of the second category. However, most of the theoretical aspects and the principles of manoeuvring which are discussed are also applicable to larger boats.

### **1.2 Nautical Terminology**

When sailing, it is essential to know the terminology used to describe the boat fittings as well as the precise terms used to define the various manoeuvres.

This terminology has been used for a long time in sailing and its advantage is that it permits orders given to be clearly understood and executed precisely.

At the end of this pamphlet you will find a list of the most important terms many, of which are used in this course.

### **1.3 The Boat**

The 'hull' allows the boat to float. Because of its long, narrow and symmetrical shape, it moves most easily in a forward direction. The 'centre board' is a sort of vertical wing in the middle of the hull which improves this tendency towards forward motion and reduces sideways movement to a minimum.

The 'rigging' comprises the support and control cables, wires and ropes – all the cordage that is needed to keep up the mast and regulate the sails.

The vertical 'mast' supports a horizontal 'boom' which can swivel from one side of the boat to the other. The 'main sail' is held between these two. In order to control the direction of the main sail, a rope called the main sheet is attached to the end of the boom. Note: a sheet is always a rope, never a sail.

The 'jib' - a triangular sail - is stretched along a wire running from the top of the mast to the front of the boat. Jib sheets at the free angle of the triangle control this sail.

The 'helm' or the 'tiller' is the device which makes it possible to steer the boat. It is attached to a streamlined vertical board plunged in the water, called a 'rudder' which swivels on a vertical axis. By pushing the tiller to the left, the boat will steer to the right and vice versa. The rudder loses its effect at angles greater than about 45°.

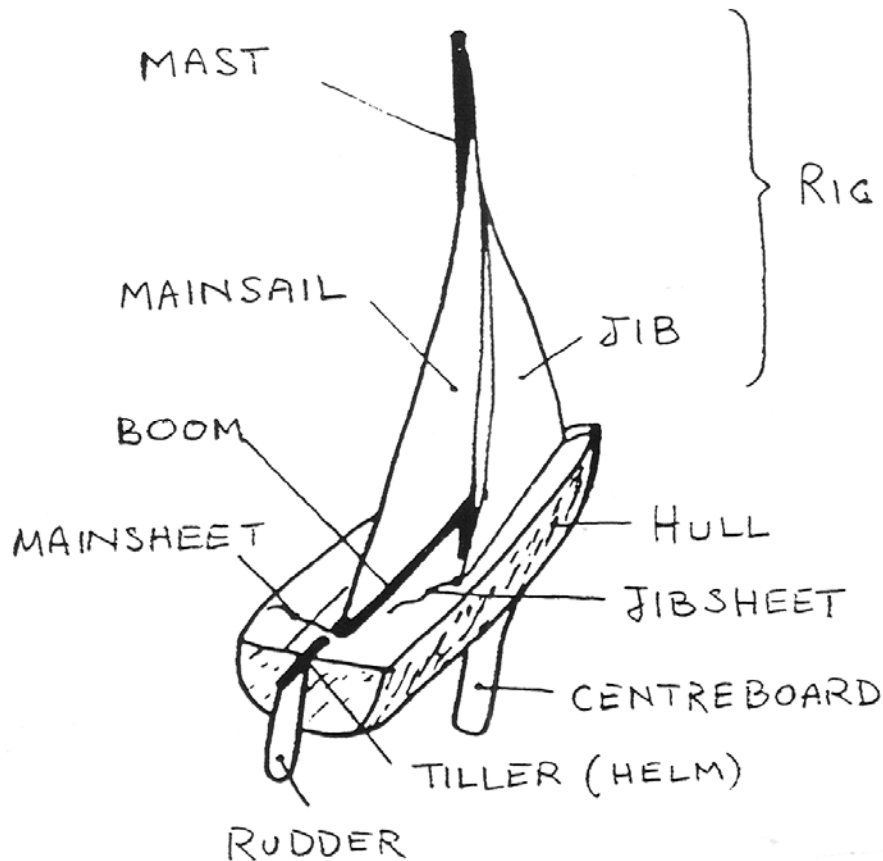


Fig.1

#### **1.4 The Boat and the Wind**

In the following drawings and explanations, we only mention the main sail. However, the principles remain the same for the jib. The division into two or more sails increases the efficiency and flexibility of the craft.

- a) The wind comes from the aft (behind). The mainsheet is eased out. The wind's force on the sail is directed towards the front of the boat and pushes it forward.
- b) The wind blows from the side. In order to fill the sail, the boom should be hauled in (with the main sheet) towards the middle of the boat.

The force of the wind on the sail can be represented as a single force  $F$  which can be broken down into a propulsive force  $F_p$  which makes the boat go forward and a perpendicular force  $F_d$  abeam which makes the boat drift sideways. Since resistance to the forward motion is much weaker than resistance to sideways motion, the boat will move forward in a direction almost perpendicular to the wind, with a slight sideways drift, and will 'heel' to 'leeward' under the effect of force  $F_d$ .

- c) The boat turns close to the direction of the wind. The main sail has to be hauled in even more. The boat still advances but with a stronger lateral component (more drift and a greater tendency to heel).
- d) The boat turns very close to wind, into the forbidden angle. The sails will eventually start flapping and the boat will lose speed and stop.

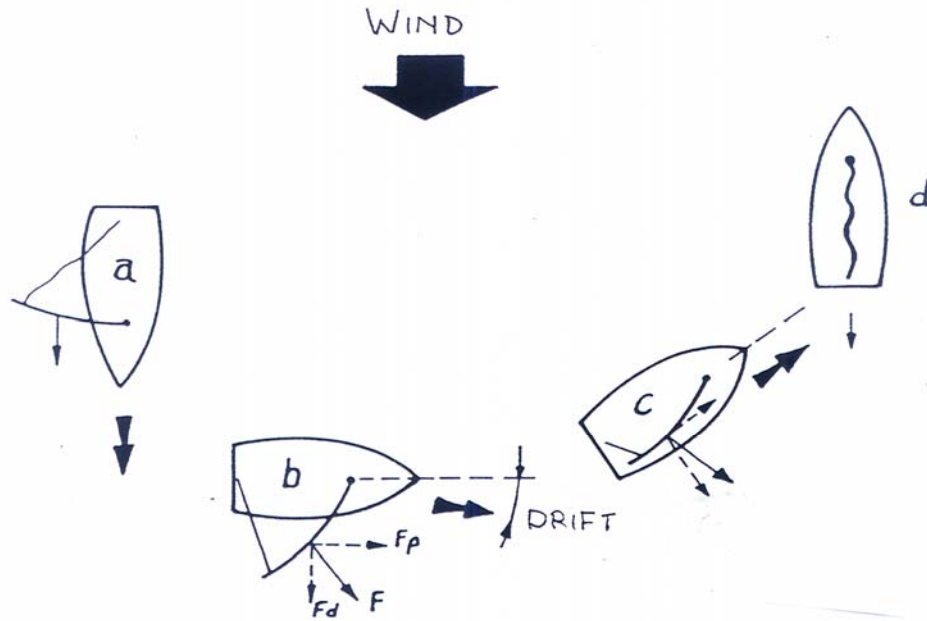


Fig.2

### **1.5 The Boat's Course in Relation to the Wind**

On a sailing boat, everything depends upon the wind. The various directions the boat takes in relation to the wind, as illustrated in Fig.3, are called 'points of sailing'.

Each one of these points requires a particular setting of the sail. The points of sailing called 'running before the wind' require easing out of the sheets and the exact setting of the sails in general is not critical. However, when sailing close to the wind, the sails are hauled in to a maximum and the speed of the boat depends much on the actual setting.

If we come too close to the wind, the boat will drift sideways more than it will advance. We enter a forbidden zone, the 'beating' zone, where one has to zigzag if one is to move against the direction of the wind. This forbidden angle varies from 90° to 110° depending on the boat.

It is essential, on a boat, always to be aware of the wind direction. An effective means to indicate the direction of the wind and to be constantly informed on its changes is the use of a burgee, a small flag at the top of the mast and/or ribbons fixed to the shrouds.

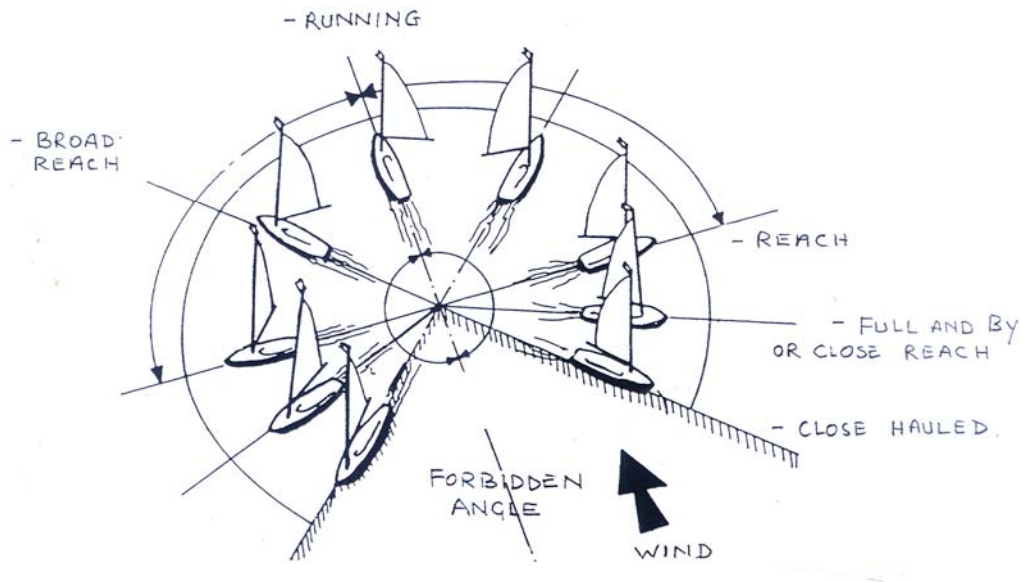


Fig.3

## 1.6 Elementary Manoeuvres

We shall deal now with the principal manoeuvres which are essential to sail a boat.

### a) Rigging the boat

This is the preparation of the boat on the beach or at anchor. The sails are 'bent' on (put on) but are not hoisted. The rudder and centreboard are fixed in position.

### b) Getting under way

The boat, lying in the water, is held facing into the wind by the bow mooring line. The sails are hoisted up the mast and forestay by means of their halliards. The sheets should remain completely free. The point of sailing is decided upon (port tack or starboard tack, i.e. with the wind blowing from left or right) and, when the boat swings in the appropriate direction, the moorings are cast off.

### c) Sail trim - balance of the boat

Having chosen the course, the sheets of the jib and main sail are hauled in according to the direction of the wind in order to obtain the highest speed.

When 'sailing close to the wind', the boat has the tendency to heel over. This should be counter-balanced by sitting on the 'windward' side, that is on the side against which the wind blows. It may be necessary to lean over the side to get greater effect; this is known as sitting out.

A boat should not heel over too much. If one cannot obtain balance by sitting out, one must free the sheets a little so as to spill some of the wind. The effect is immediate, and the boat rights itself again.

At other points of sailing, the crew is placed in such a way that the boat remains more or less on an even keel.

In most cases, and for best trim, the crew should be grouped together more or less towards the centre of the boat, where they produce least turbulence and maintain the fore and aft balance.

**d) Changing course (Fig. 4)**

Between (A) and (B), by pushing the tiller, we have brought the wind more directly ahead, that is, we have brought the boat more into the wind. At the same time, we have trimmed the sails in more to keep them drawing. The helmsman has put the 'helm down', or has 'luffed' more to wind.

If we leave the tiller in this position, the boat will pass through the wind (C), the wind will spill from the sails and, because of its inertia, the boat will continue on her course and (D) change tack. This is called 'going about', and is a basic manoeuvre in sailing.

Between (E) and (F), by putting the 'helm up' (to windward) the boat turns more to leeward. The sheets are loosened off somewhat. Here we say that the helmsman has come round off the wind, or he has borne away.

One can also continue changing direction when the boat is running before the wind (G), but it will be necessary to gybe, that is to let the boom pass to the other side of the boat. At this instant, it is necessary to keep rigorously on course (H). From the new position we can take up our course again, on the new tack. This manoeuvre is called 'gybing' and is somewhat more difficult to perform than going about particularly in strong winds.

**e) Berthing and derigging of the boat**

To come alongside a quay or to tie up to a buoy, the boat must arrive facing into the wind, and should have lost all way (speed) at the moment of arrival. The sails spill, the sheets are eased out, the boat is moored to the buoy, and finally the sails are taken down.

After this, the boat is derigged, tidied up and cleaned and, if there is any damage, this should be repaired or reported to the person in charge of maintenance.

In all sailing clubs, it is standard procedure to leave the boats in a state of perfect order and cleanliness.

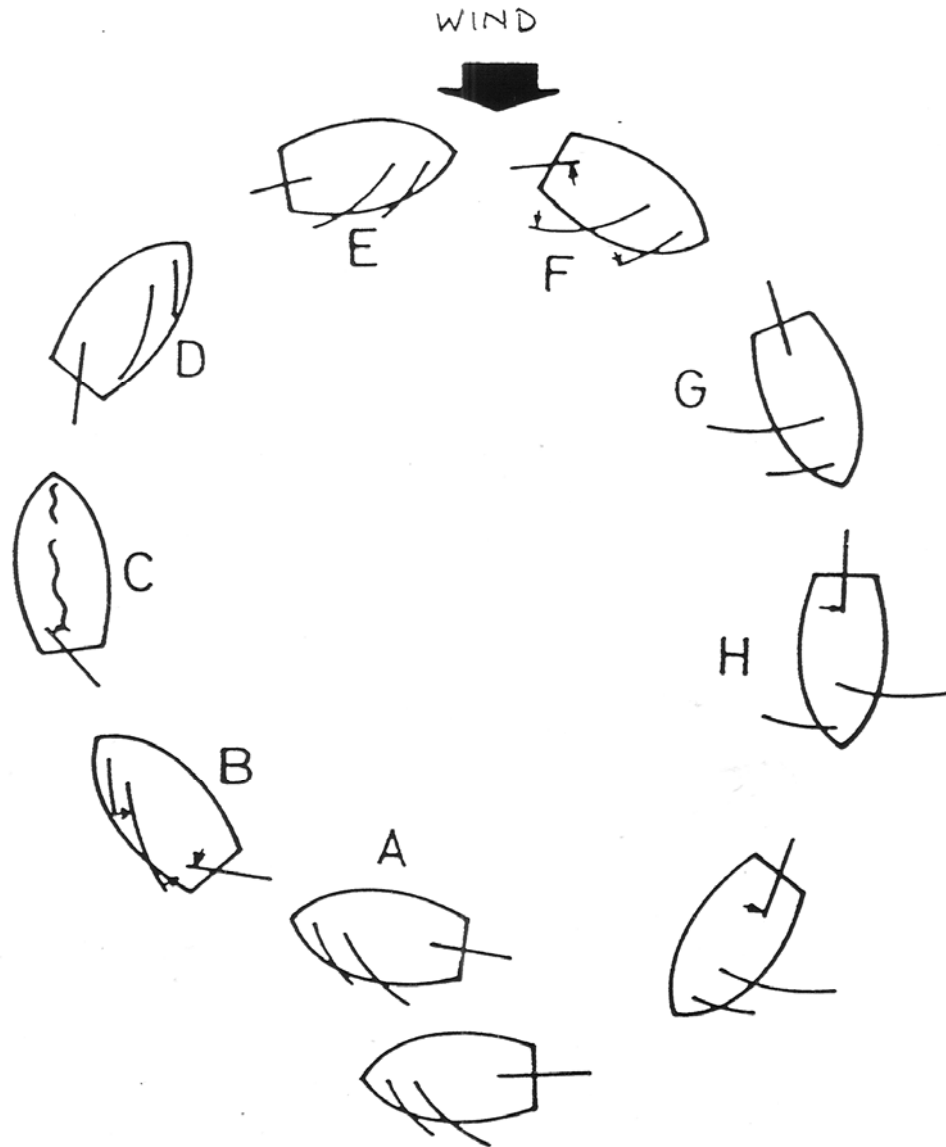


Fig.4

### 1.7 Practical Suggestions

- While in port, get to know the names of the parts of the boat and how to rig it.
- With the boat facing the wind, learn how to hoist and take down the sails.
- On the water, get familiar with the reactions of the boat to the tiller.
- Note the wind direction, and find the best setting of the sails on every point of sailing.
- Practise going about smartly.



## 2. Safety in Navigation

As in any other sport, sailing entails taking certain risks, which one must know how to deal with, e.g. capsizing, going aground, uncontrolled drifting, and various material failures. They may arise due to bad judgement (too strong a wind and too much sail), to a rigging failure or to an incorrect manoeuvre.

**Remember: all accidents are the result of a mistake.**

### 2.1 Basic Safety Rules

- a) **Have your boat in good order**
- Rudder, centre board, rigging, sheets, halliards checked;
  - Buoyancy tanks watertight and plugs in place;
  - Be in possession of a bailer, a paddle with boathook, foghorn or whistle, red flag;
  - Have a waterproof bag with various items for repairs if needed (lanyards, lengths of rope, nails, knife, pliers, wire, shackles, etc.)
- b) **Adjust the sails according to the wind:**  
The wind's force is expressed in the Beaufort scale.

| Force | Wind            | Open Sea                       |
|-------|-----------------|--------------------------------|
| 0     | calm            | sea like a mirror              |
| 1     | light air       | surface rippled                |
| 2     | light breeze    | small but noticeable waves     |
| 3     | gentle breeze   | small waves, some white horses |
| 4     | moderate breeze | many white horses              |
| 5     | fresh breeze    | moderately long breaking waves |
| 6     | strong breeze   | numerous breaking waves        |
| 7     | near gale       | heavy breaking waves           |
| 8     | full gale       | sea white with foam            |

With a wind over force 5, one does not usually go out in a dinghy. Even with wind force 4, a trapeze and a trained crew is required.

From wind force 4 upwards the surface area of the sails must be reduced, if possible while still in port, or on the water if one is taken by surprise. These manoeuvres are further explained in Part 3, section 5.

Storm warnings are given at Versoix, Nyon, Nernier and Geneva. 40 flashes per second - possible storm; 90 flashes per second - storm imminent. Remain in port or enter a port as quickly as possible.

- c) **Be well equipped**
- Always be warmly dressed. If you fall into the water, the more clothes you wear, the longer it will take to get cold.
  - Have an oilskin suit or jacket to protect you from the spray, which also has the advantage of keeping your body warm if and when you go overboard.
  - Have a waterproof bag with a spare set of clothes.

d) **Wear a life jacket**

This is absolutely essential at all times for beginners and for trained crews as soon as the wind reaches force 4, particularly when the water is cold (15°C).

## **2.2 Possible Accidents**

a) **When capsizing**

Don't ever leave the boat; hang on to it even if the coast seems near. Wait for help. If you are cold, club onto the hull, sit astride and wait patiently. If a trained crew is involved and water conditions permit, (few waves) you may try to right the boat and bail out. In order to do this, you must:

- Swim to the mast head and support the mast to prevent it from sinking;
- Haul down the sails remembering to fasten the halliards around the cleats (in order to be able to get at them again);
- Get one member of the crew to hold the boat with its bow into the wind, while the other uses the centre board as a lever to right the boat. The boat must be prevented from capsizing over to the other side by having one crew member stabilize the boat.
- Bail. Send the lightest member on board to bail the boat as soon as this is possible.

b) **Drifting onto the shore**

This may happen as a result of a poor manoeuvre or rigging failure. If the water is shallow, raise the centre board and rudder at the last moment and spring out so as to beach the boat without damage. If beaching appears dangerous or risky, don't hesitate to throw out the anchor with all its line. Check that the line is fastened to the boat. Wait for rescue.

c) **Breakage of the rigging**

Try to do a running repair or paddle back to port without sails.

## **2.3 Suggestions**

- Always have your equipment in perfect order;
- Wear a life jacket;
- Don't force the issue of whether to go out or not, don't ever be afraid of appearing silly;
- If you plan to sail on a stretch of water which is unsupervised, notify somebody on land of your intentions.

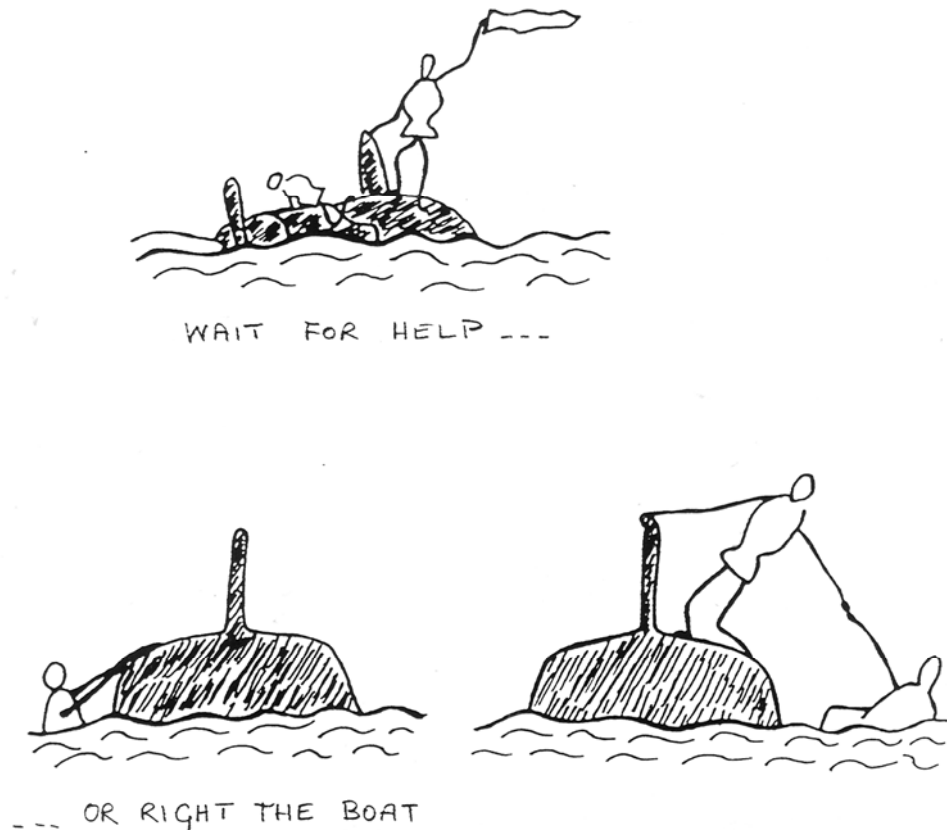


Fig.5

### 3. The Manoeuvres

#### 3.1 Going About

This is the expression used when one changes course by passing through the wind. The manoeuvre can be considered correctly executed if it is done with a minimum of loss of speed. If it is badly done, one runs the risk of not passing through the wind and getting caught 'in stays', or 'in irons', i.e. with the boat stopped and the wind dead ahead. It may then be necessary to repeat the manoeuvre, which is not always possible, for instance near an obstacle or in a crowded port. There is also the risk of capsizing in a high wind, if the crew does not keep the boat balanced.

Sequence of actions (Fig.6)

- So as not to lose speed, trim in the sails as the boat comes closer to wind. (A)
- The helmsman calls 'ready (to go) about'. The crew clears the sheets, sees that nothing is obstructing them and answers 'Ready'.
- The helmsman firmly puts down the helm, i.e. pushes the tiller away from the wind, and says 'Lee-O'. As the boat luffs up and straightens, the crew shifts towards the middle of the boat, so as to keep it balanced. (B)

- The boat comes head to wind, and as soon as the jib spills – and not before! - the sheet so far hauled in tight is released. (C)
- The boat passes through the wind and the boom moves across to the other side. The main sail should be eased out a bit; the jib is then hauled in (but not too quickly) and set out for the new tack. The crew sits a bit towards the new (windward) side. (D)
- Bear away slightly more; haul in the main sail, the crew sits out to windward to balance the boat (E). Follow the newly chosen course and set the sails accordingly.

During B, C and D, the boat is not being driven forward; speed is lost. The boat should have gained enough speed beforehand to carry through this manoeuvre.

If the crew does not take care to keep the boat balanced by changing position, there is danger of capsizing. The crew should constantly seek to balance the boat.

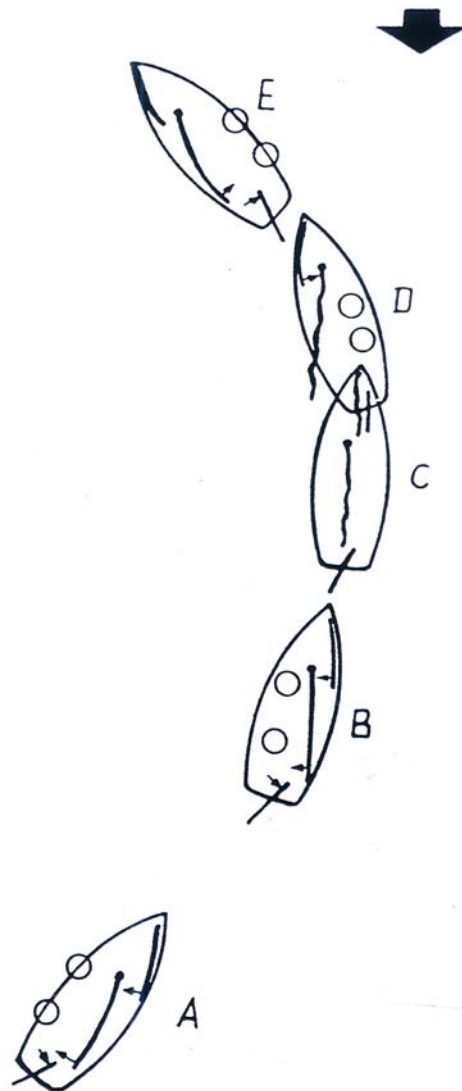


Fig. 6

### When you miss going about (getting into 'stays')

This can sometimes be remedied in the following manner: when one is almost dead into wind, quickly set the jib 'aback' in its original position on the weather side. As soon as one is off the wind, bring the tiller to windward, haul the jib on the new tack, and then haul in the main sheet.

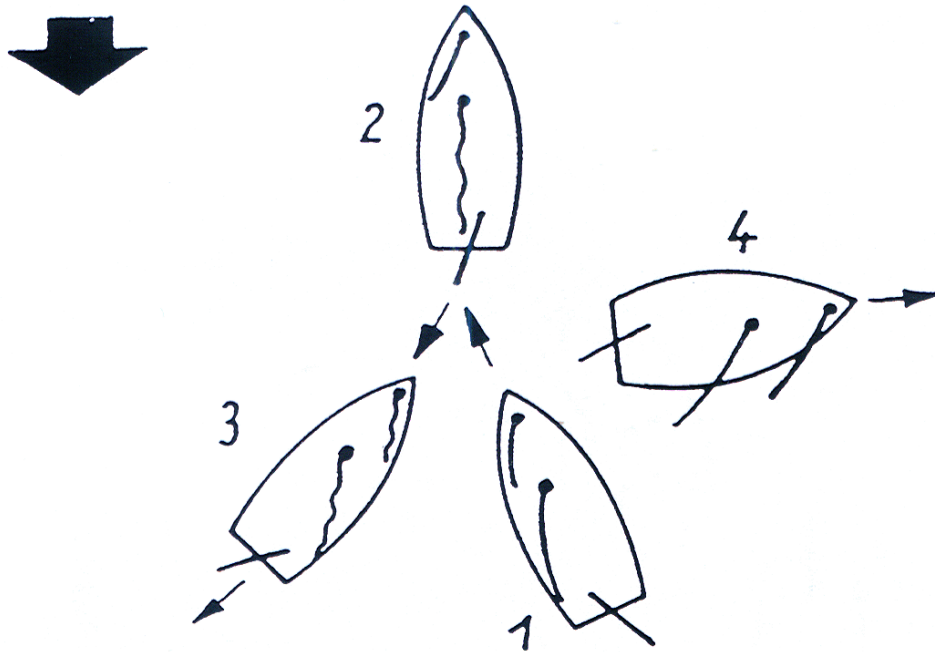


Fig. 7

### Suggestions

For successfully going about one must:

- gain speed by trimming in the sheets with boat close hauled;
- push the tiller firmly to leeward;
- wait to slacken off the jib sheet until the jib sail spills;
- bear off a little on the new tack by easing out the main sheet.

The beginner may be somewhat confused by the drastic change of course. It is important to try to foresee the course to be taken after going about, in relation to the wind and the shore.

### 3.2 Gybing

The expression 'gybing' applies to the manoeuvre which results in a change of tack when sailing with the wind from behind. It is more risky than going about, but can be safely done with good weather. However, beginners should refrain from gybing as soon as the weather becomes rough.

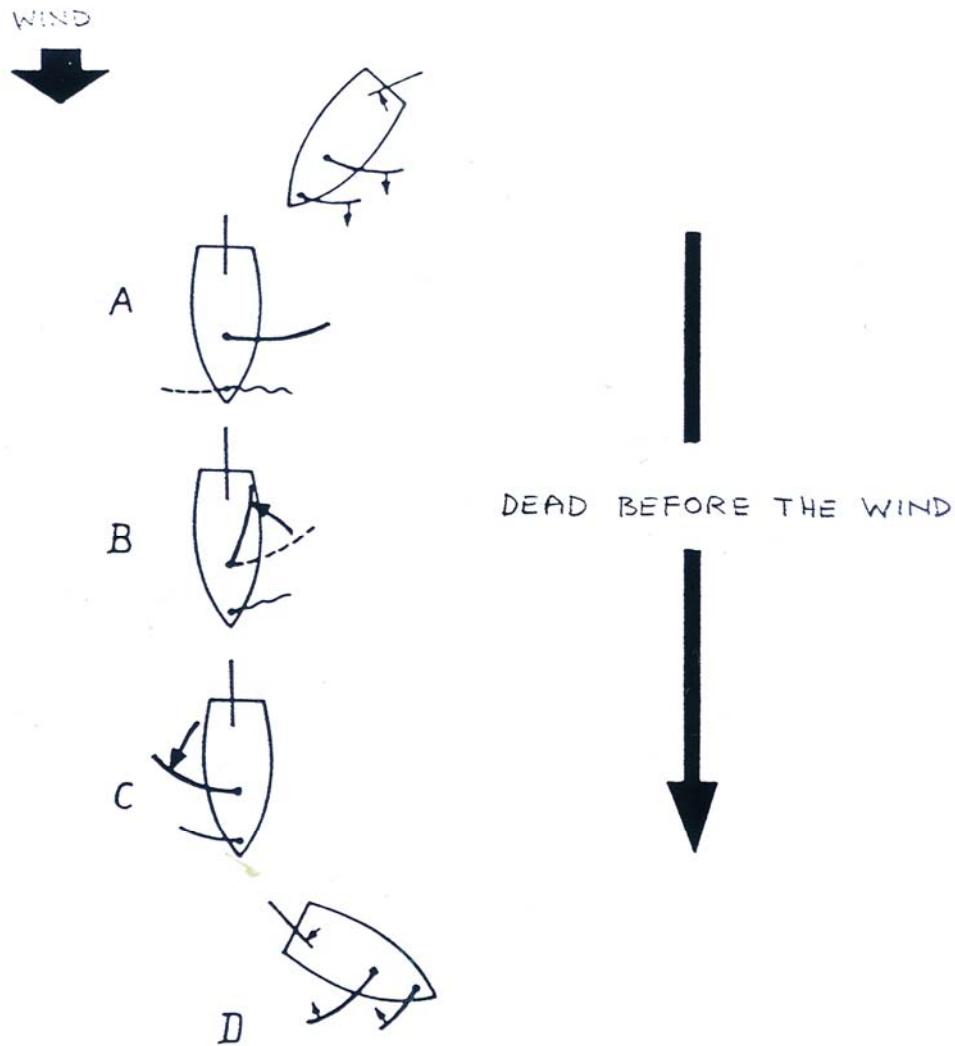


Fig. 8

Sequence of actions.

- Bear away until the wind is dead aft, whilst easing out the sheets to the maximum. The jib, in this case, can be brought over to the opposite side, which is called 'goose winged'.
- The helmsman calls 'ready to gybe'. The crew should ensure that he is not in the line of the boom as it swings from one side of the boat to the other. He then answers 'ready'.

- Keeping rigorously on course with wind dead aft, the helmsman hauls in the main sail completely, so that it is as close as possible along the axis of the boat. The boom can then be made to pass over to the other side. It may do this of its own accord, or can be assisted by the helmsman. As it does so the helmsman cries "Gybe-O" and rapidly eases the sheets of the main sail, taking care meanwhile that the course does not change. Should the boom fail to pass to the other side, one can push the tiller in the direction in which the boom should go.
- Finally, take up the new course and set the sails accordingly.

The boat is driven forward during the entire manoeuvre, which can be repeated continuously. However, gybing does present certain difficulties which may lead to the boat capsizing.

#### **Possible accidents when gybing**

- Involuntary gybing: the boom passes unexpectedly from one side to the other, either because the helmsman has allowed the helm to come up too much and the wind is no longer dead aft, or because the wind direction has suddenly changed, and the boat is sailing 'by the lee'.
- Sudden broaching to: this may happen at the moment of gybing if the helmsman has not kept on course or if the main sheet is jammed.

#### **Suggestions**

- First be sure to have the wind dead aft. During the manoeuvre, watch the burgee closely.
- Steer absolutely straight during steps A, B and C.
- Be sure that the main sheet is clear to run freely.

### **3.3 Getting Under Way**

One must bring the boat to a site which offers ample space to leeward, and where there is no risk of colliding with other boats.

Generally speaking, as soon as one is ready to hoist the sails, the boat must be placed facing windward in such a way that the sails spill freely. Do not haul in the sheets until the boat is under way and do not attempt to prevent the mainsail from swinging freely by holding the boom.

Before hoisting sail, check the boat and the emergency equipment.

### 3.3.1 Casting off from a buoy

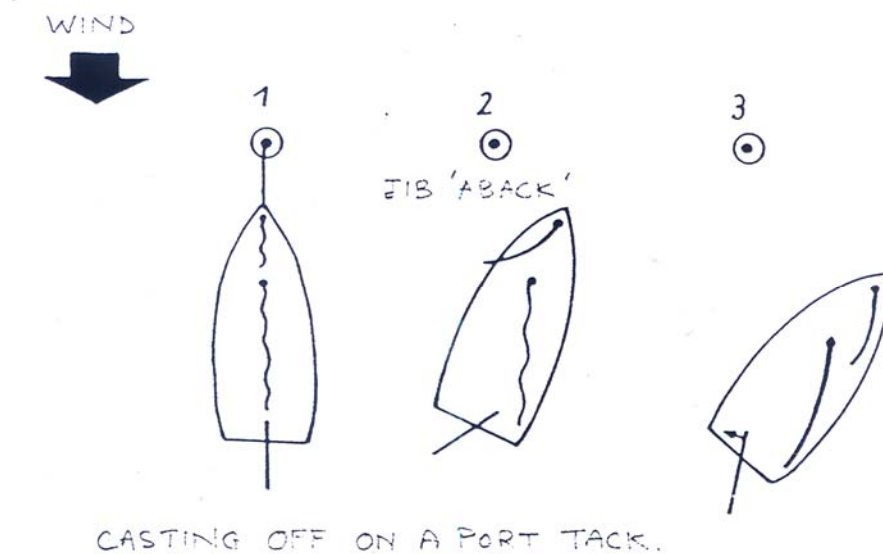


Fig. 9

- The boat is moored forward and will swing, face to windward, of its own accord.
- Choose starting tack (star-board tack, wind on the right hand side of the boat or port tack [as the figure] with the wind on the left hand side).
- The forward mooring line should be cast off at the moment when the bow is swinging in the desired direction. The jib may be temporarily aback to assist in bearing away. Both sheets are then hauled in and the boat gets underway on the foreseen course.
- Casting off from a buoy is easier than launching from a beach, and we advise beginners to practise it in Versoix. Prepare the sails on the beach or on the quay, but don't hoist them. Paddle to a mooring buoy that is unoccupied, hoist sail, and cast off as described.

### 3.3.2 Launching from a shore

- Move as much as possible to the windward side of the shore in order to leave maximum room to leeward for the launching manoeuvre.
- The helmsman, standing in the water, holds the bow of the boat forward to turn her into the wind.
- The helmsman pushes the boat out letting her bear away somewhat, then climbs in. The rudder and centre board are lowered, the sheets are hauled in and the boat gathers way on the desired course.



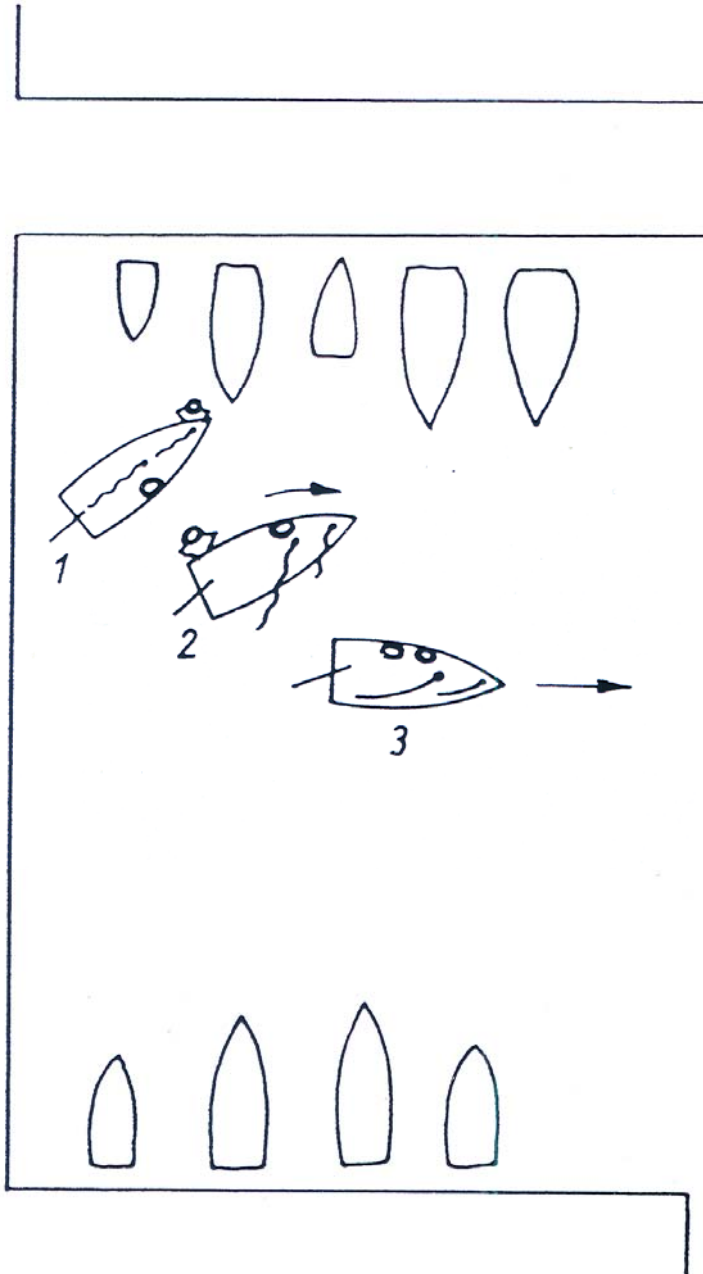


Fig. 10

### **3.4 Picking up a Mooring**

To pick up a mooring under sail the boat must be stopped by sailing directly into wind with the sails spilling. The correct judgement of the stopping distance for boats of different weight and for different wind conditions is gained by experience. Difficulties may be encountered if the distance is underestimated when luffing up towards a quay with a boat too heavy to be stopped by brute force.

On a reach, sail to a point about 3 boat lengths directly to leeward of the buoy. On the command 'let fly the sheets' luff directly into wind, so that the boat loses way and stops within reach of the buoy.

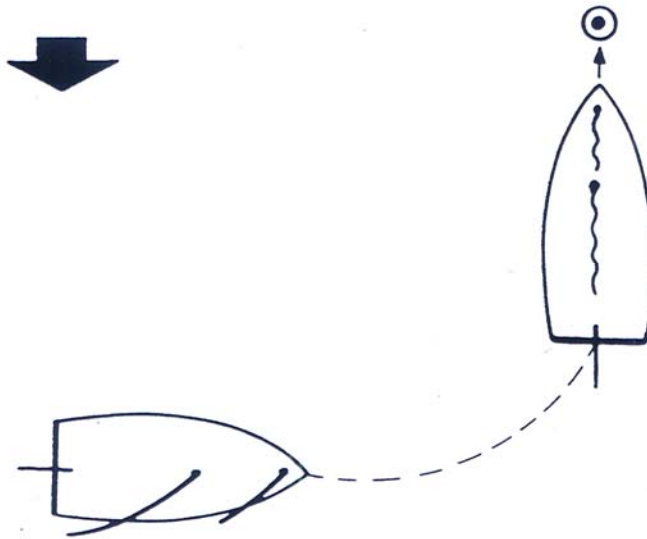


Fig. 11

#### **Returning to a shore**

One performs a similar manoeuvre when returning to shallow water. A member of the crew jumps into the water to grab the boat forward and hold her facing into wind, while the helmsman lowers the sails. The centre board and rudder should have been taken in at the last moment and before they could touch bottom.

In stronger winds it is advisable to have two crew members in the water to hold the boat.

With a wind blowing in the direction of the shore, it is preferable to lower the main sail beforehand (with the boat into wind) and to come in with the wind dead aft with only the jib raised. This reduces speed considerably and one can even come directly onto a beach of sand or mud.

#### **Picking up a berth on a landing stage or quay**

If the wind is blowing parallel (or almost parallel) to the quay (A) the helmsman luffs into wind alongside the quay and as soon as conditions allow, a crew member will

jump onto the quay with a line with which to moor the boat forward, and if necessary aft. The sails are lowered if it is not intended to leave again immediately.

With the wind either blowing from the quay or towards it, berthing becomes difficult. A more or less fool-proof solution is to lower main and jib before arriving, and then to berth before all way is lost. It needs practice to do this gracefully.

Mistakes when picking up a mooring is the most common cause of damage to boats. It cannot be overstressed that the safest way to berth a boat is to pick up a buoy, lower the sails and complete the manoeuvre using a paddle.

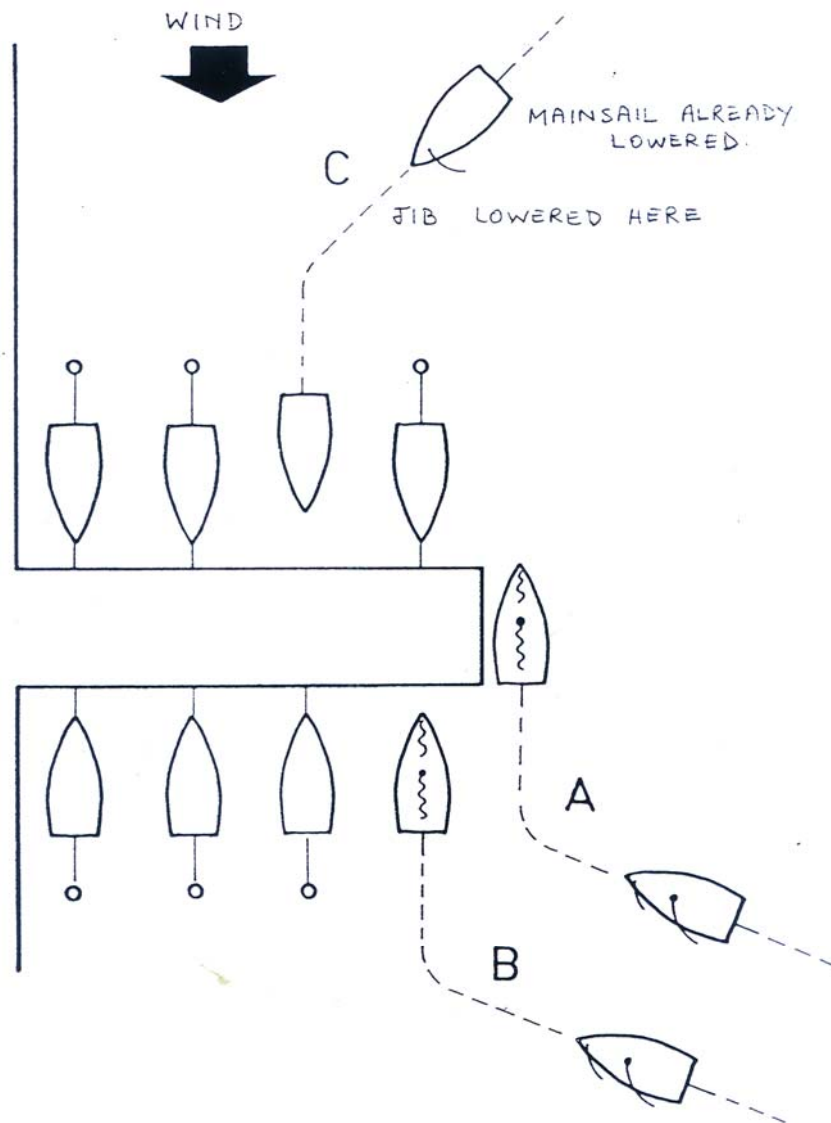


Fig. 12

### **3.5 Man Overboard**

Whenever a crew member falls overboard, the following actions should be executed immediately.

- Cry 'man over board'.
- Throw a life belt or similar buoyant object.
- If the victim is unconscious and has no lifejacket, a second person should spring overboard to give assistance.
- The victim should be kept in sight at all times.
- Following the manoeuvre described below, bring the boat alongside the person in the water.
- Haul the victim aboard over the stern.

#### **Man Overboard Manoeuvre**

The final part of the manoeuvre is executed as for picking up a mooring (see Fig.4). If the accident occurs when sailing to windward, the boat must be brought down to leeward of the victim by one of two methods.

Continue to windward for 5 boat lengths before bearing away down wind. Gybe when the victim is approximately 'off the beam' and without haste, come round to a close hauled tack before luffing to wind.

In strong winds, gybing may be considered risky. In this case, directly bear away and sail on a broad reach for 10-20 boat lengths then luff to wind, come about, and return on a broad reach to lee of the victim. The manoeuvre is completed as before. This second method is known as a 'figure of 8' manoeuvre.

These manoeuvres are normally practised using a floating object as a 'victim' and should be mastered in all wind conditions.

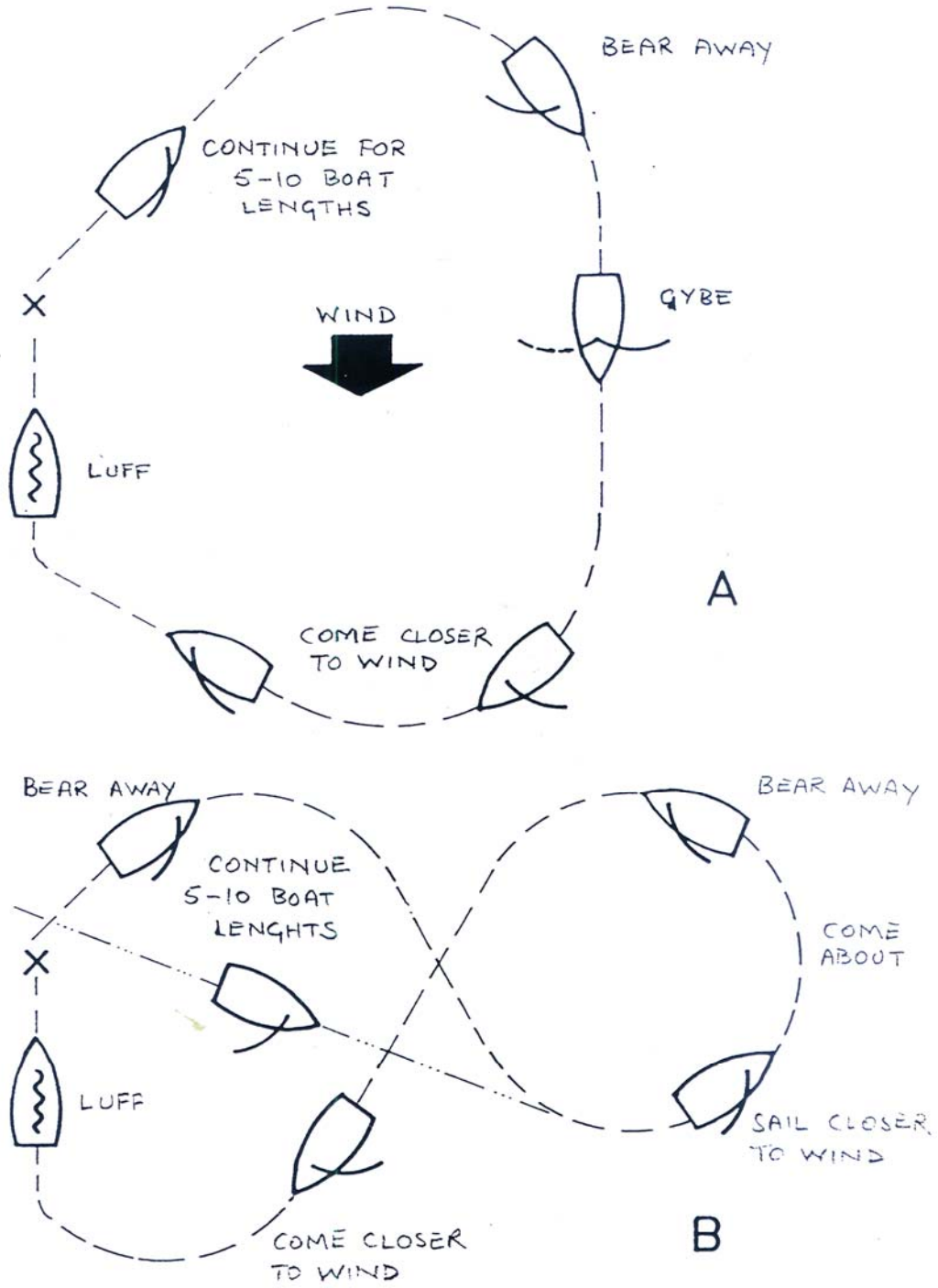


Fig. 13

### 3.6 Heaving to

A boat is said to be 'hove to' when it is stopped at sea, but remains manoeuvrable and under central of the tiller and sails. The manoeuvre is executed as follows.

The boat is brought close to wind, before going about with main and jib sheets left hauled in. The jib sets 'aback' and the forces on mainsail and jib move contrary to one another. The boat will then, with some sail trim, 'forereach' very slowly at right angles to the wind.

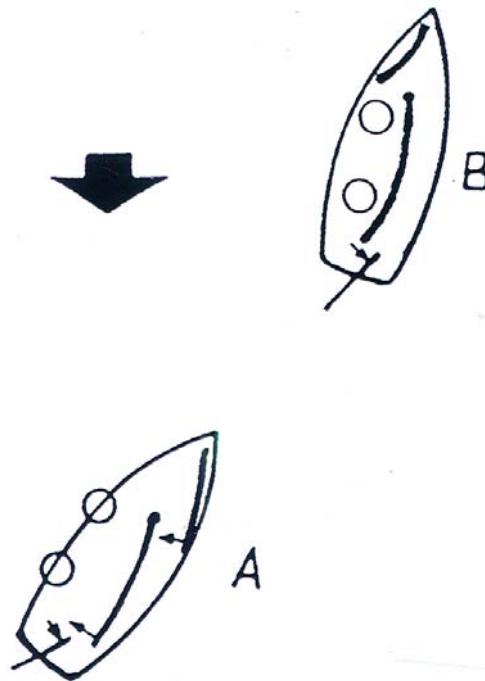


Fig. 14

### 3.7 Reefing

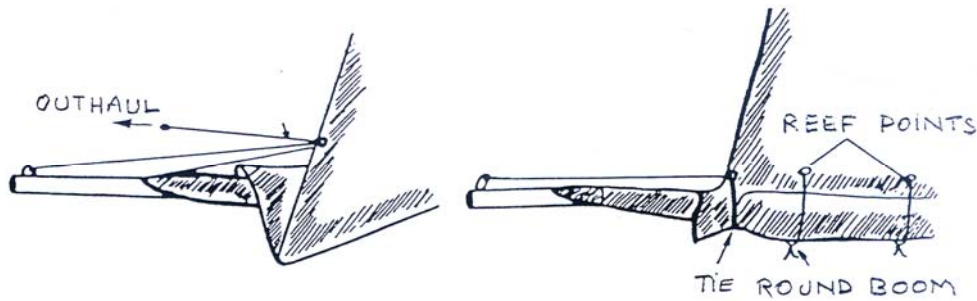


Fig. 15

Generally a reef is taken in the mainsail, to adapt the surface to the strength of the wind as soon as white horses develop or when the boat heels excessively.

This operation is easiest if done in port before hoisting the sails:

- Pull the 'reefing pennant' (a special rope) through the eyelet in the tack (forward corner of the foot) in the reef band and attach it to a hook fitted specially for this purpose on the boom.
- Do likewise with a second reefing pennant and the clew (aft corner); pass it round the cleat at the end of the boom then around the boom making it fast so that the eyelet is fastened on top of the boom.
- Tie the reef points around the boom by rolling up the sail, but be careful not to pull too tight.
- Then, hoist normally.

This manoeuvre may be necessary when out on the lake because of an unexpected increase in the wind force. In that case, one must sail close hauled, then lower the main sail partly, keeping the boom inside the boat, and continue sailing on the same course with the jib only (the boat will now carry leehelm and will tend to bear away). The sail is now reefed as previously described.

### 3.8 Trapeze Sailing

The trapeze is very useful in maintaining the balance of small sailing boats in strong winds.

a) **The Trapeze** consists of a harness with a hook; a port and starboard trapeze wire, with ring and tackle for position adjustment.

b) **Correct adjustment**

The harness should be fitted snugly to the body with the hook at about the height of the body centre of gravity.

The trapeze wire tackle should be adjusted so that the crew can just sit comfortably on the 'gunwale' when sailing normally. When using the trapeze the body should be fully extended and be at right angles to the mast for maximum righting effect.

**c) Sitting out on the trapeze**

- The trapeze ring is placed over the harness hook.
- The crew sits out so as to load the trapeze wire.
- The forward foot is placed on the gunwale.
- The jib sheet is jam cleated and with both feet on the gunwale the crew stretches out to full length.
- Control over the jib sheet is regained.
- During the manoeuvre the helmsman must maintain the heel by adjusting the mainsail should the wind alone be insufficient.

**d) Returning to normal position**

- With decreasing wind the crew moves his body inwards, supporting himself finally with the trapeze handle only (hook disengaged).
- When coming about or gybing the mainsheet should be progressively adjusted so as to reduce heel. This enables the crew to disengage from the trapeze and thus avoids capsizing to lee during the manoeuvre.

**e) Trapeze work**

The crew on the trapeze should keep watch for gusts of wind and be prepared to quickly compensate by moving the body weight outwards.

When sailing to windward against waves, the crew should anticipate the plunging of the boat by supple leg movements. Even in moderate winds the trapeze equipment should be prepared so as to benefit from any unexpected increase in wind.



YCC Sailing Course for Beginners

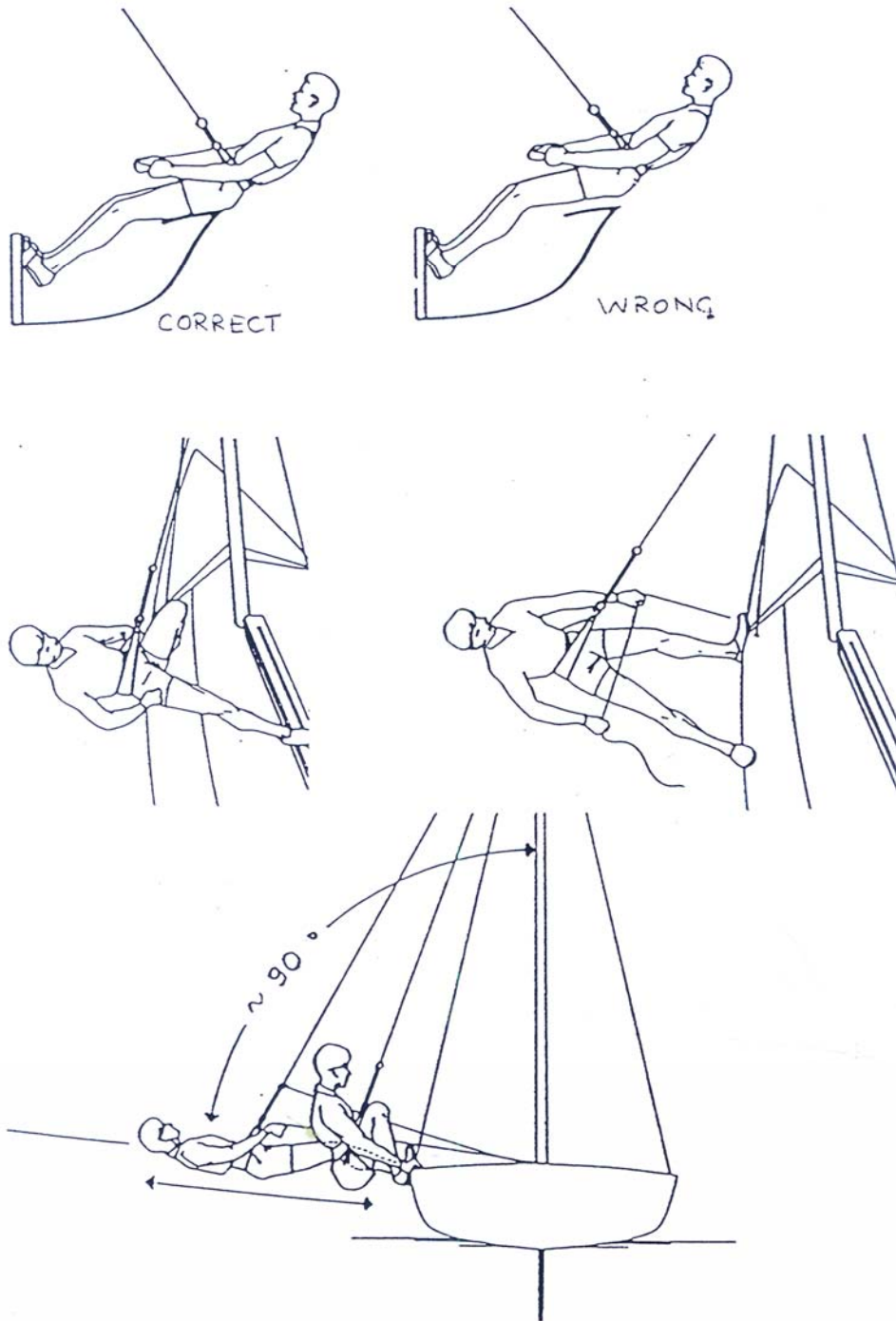


Fig. 16

### **3.9 Spinnaker Sailing**

The spinnaker ('spi' for short) is used in light winds with the wind 'abaft the beam' (running).

#### **a) Spinnaker equipment (Fig. 17,18,19)**

This consists of spinnaker sail, spinnaker boom, topping lift, down haul, sheet, guy, halliard and sailbag.

The sheets and the head, tack and clew of the sail are coloured to aid correct rigging. Starboard in green, port in red. The tack is shackled to the guy, the clew to the sheet; guy and sheet are determined only by the position of the spinnaker boom. (see Fig 17).

#### **b) Setting and lowering the spi (beginners)**

- The spi is untwisted in its sack.
- Head, tack and clew are correctly shackled on.
- Sheet, guy and halliard run outside the shrouds and forestay.
- The spi boom, fully rigged with the guy in the snap shackle is attached to the mast fitting.
- The boat is steered dead before the wind.
- The spi is hoisted in the lee of the jib.
- The guy is hauled in so as to bring the boom to the correct angle.
- Correct course is now steered and the spi trimmed with the sheet.

#### **c) Lowering the spi**

- The boat is steered dead downwind.
- The boom is allowed to swing to the forestay.
- By simultaneously freeing the guy and halliard and hauling in on the clew, the sail is stowed in its sack, ready to be set anew when required.

#### **d) Trim of spinnaker and boom**

- Using the topping lift and downhaul, the boom is adjusted at right angles to the mast. Before the wind, wind and boom should also be at right angles. On other courses the angle between boom and wind is somewhat smaller, and in the limiting case the boom touches the forestay with the boat sailing at about 80° to the wind. At angles closer to wind than this the spi causes excessive heeling and drift.
- The foot of the spi should be about horizontal when running (tack and clew at the same height.)
- To compensate boat movement, only the elastic downhaul should be effective.
- The spi is correctly trimmed when the luff shows a slight tendency to collapse.
- Should the spi collapse in light wind, a tug on the sheet is normally sufficient to fill it again.
- The sheet must be retrimmed at each change of course.

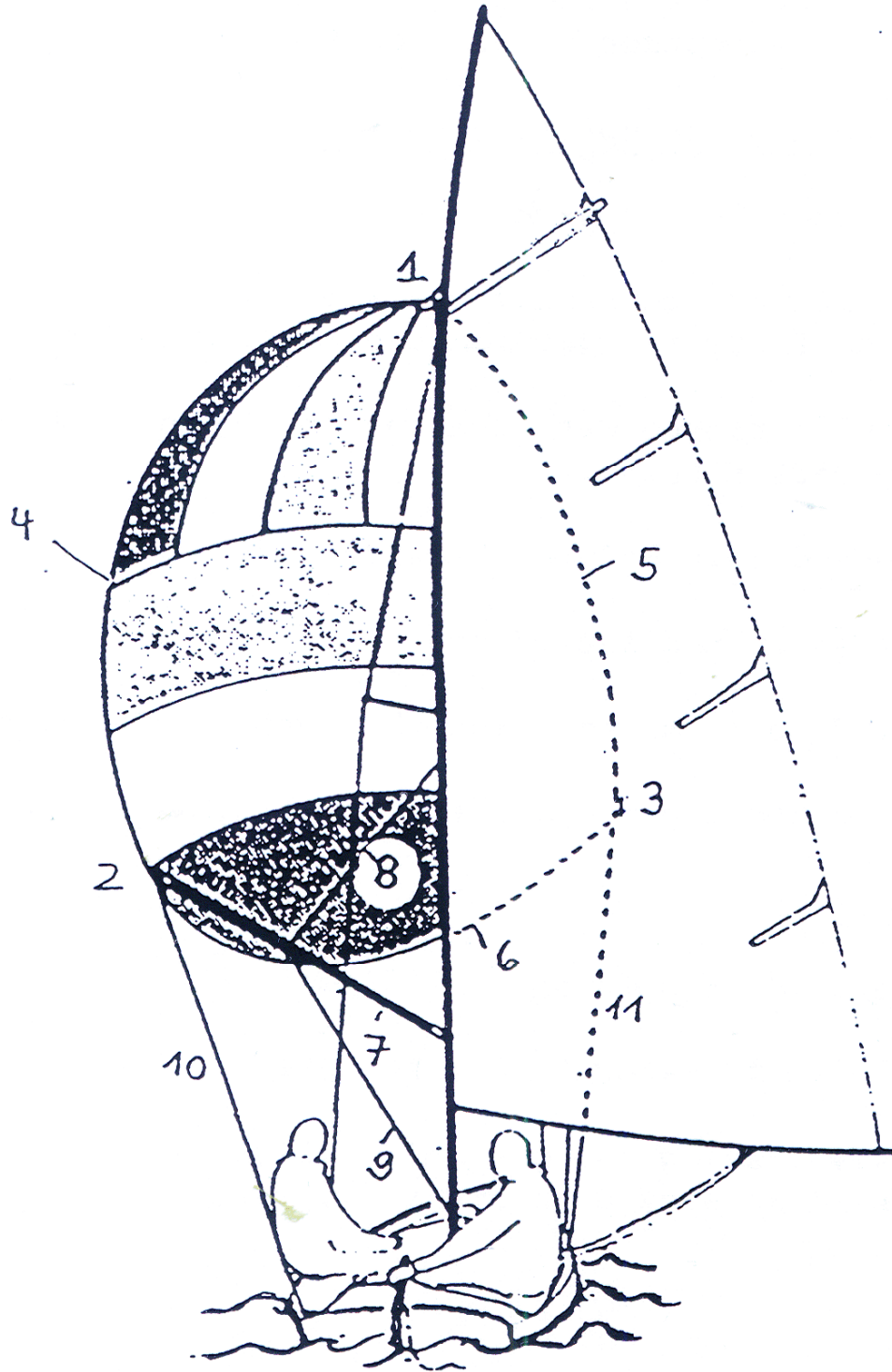


Fig. 17

1. Spinnaker head 2. Tack 3. Clew 4. Luff 5. Leech 6. Foot 7. Boom  
8. Topping lift 9. Downhaul 10. Guy 11. Sheet

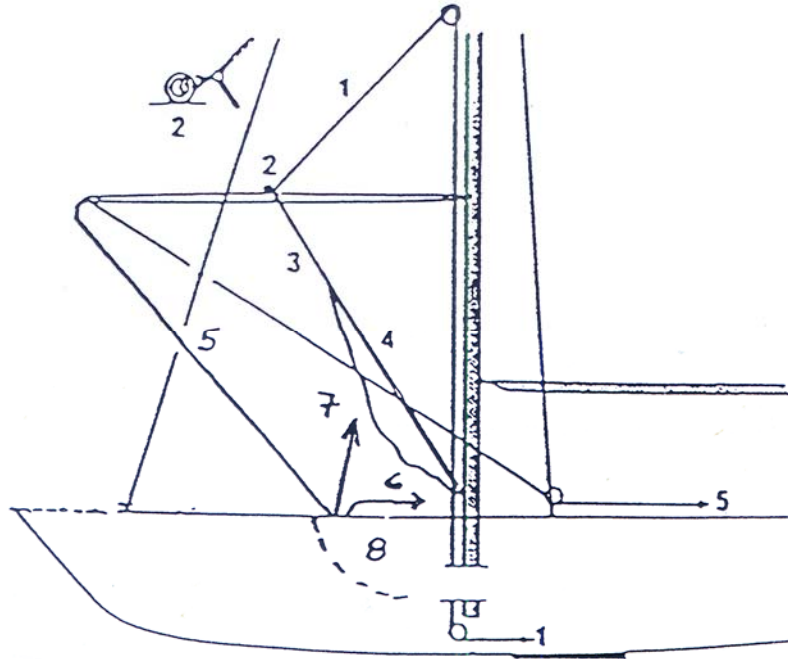


Fig 18

1. Topping lift 2. Eye on spi. boom for topping lift hook 3.and 4. Downhaul with rubber section 5. Guy 6. Sheet 7. Spi. halliard 8. Spi. bag forward of mast.

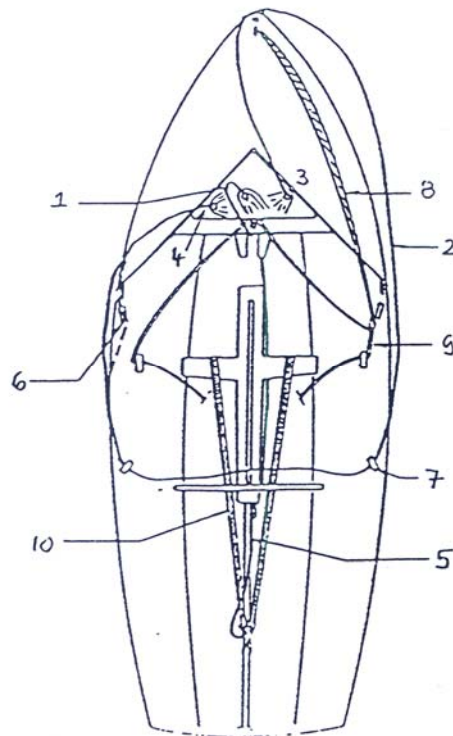


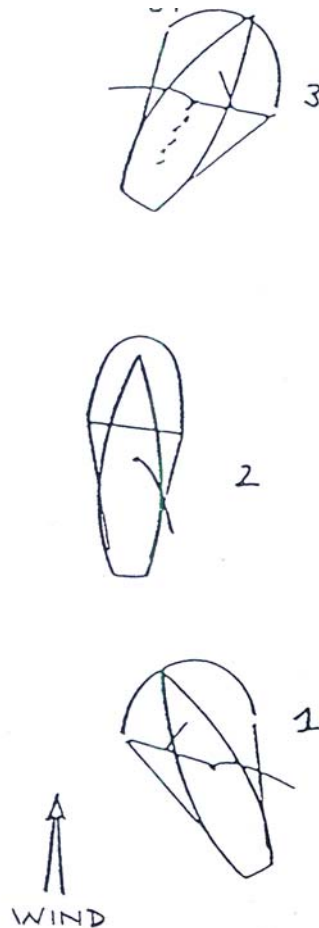
Fig 19

1. Spi head with halliard 2. Spi. sheet 3. Spi clew with sheet 4. Spi tack with guy  
5. Spi. halliard 6. Jam cleat 7. Fairlead 8. Jib 9. Jib sheet 10. Footstraps

Note endless spi sheet / guy

e) **Gybing under spinnaker**

- The boat is steered dead before the wind.
- The crew then releases the boom from the mast and clips the free end on to the sheet. The boom is now attached to both sheet and guy.
- The main sail is gybed and the spinnaker boom released from the old guy and clipped into the mast fitting.
- The new course is steered and the spi retrimmed with guy and sheet.



GYBE

Fig. 20

**A few practical hints**

- The spinnaker manoeuvres should be first tried out on land with the boat on the trailer (but the crew not on board!)
- It is advisable to check the spi equipment before leaving harbour.
- When under spi the crew is normally responsible for the jib and spinnaker sheets; only during hoisting does the helmsman look after the sheet and guy.
- With the centre board up, the boat will readily plane under spinnaker.

### **3.10 Rules and Regulations on the Lake**

The official rules are contained in the booklet 'Naviguez dans les eaux Suisses'. These rules have been in force since spring 1979.

- a) All boats should keep clear of a boat with a blue flashing light, or giving a special sound signal. If necessary one should slow down or stop. (Rule 315.5)
- b) With the exception of (a), all boats, excepting regular transport steamers and commercial fishing boats showing the appropriate signals, should keep clear of sailing boats. (Rule 315.6.D)
- c) If two sailing boats approach one another with a risk of collision, the boat on the starboard tack has priority. If both are on the same tack, the leeward boat has priority. A boat is on the starboard tack if the mainsail is to port, and vice versa. (Rule 315.15)
- d) Boats giving way should steer well clear of the other, and in particular should not approach to within less than 50 metres of regular steamers, boats being towed and professional fishing boats showing the official signals. Fishing boats towing a trawl should not be approached to within less than 200 metres when being passed astern. (Rule 315.15)
- e) Boats unable to manoeuvre should show a swinging light or a red flag if other boats approach. The disabled boat may give a sound signal of '4 short blasts' (for example on the foghorn). All boats must give way to a disabled boat. (Z.315.19)
- f) Boats leaving harbour (including motor boats!) have right of way over those entering, except when the entering boat is in distress or is a regular steamer. These boats should signal their entry by '3 long blasts'. (Rule 315.21)
- g) Boats not wishing to enter harbour should not obstruct or hinder in any way other boats wishing to enter or leave. (Rule 315.22)

Regular steamers show a green ball. (Rule 319.17)

Professional fishing boats show a yellow or white ball. (Rule 319.26)

A sailing boat under motor power, whether carrying sail or not, is considered as a power boat. (Definition 114)

A windsurfer under sail is a sailing boat.

#### **General remarks concerning the rules**

Sailing boats have priority over all other pleasure boats (motor boats, racing boats, peddalos, etc., except when entering port). Nevertheless, never assume that the helmsman of the other boat knows the rules and will give way at the last second!

Boats participating in a race observe, between themselves, other rules. They must nevertheless observe the official rules with respect to non-participants' boats.

It is considered unfriendly for a non-racing boat to force participants in a race to observe unnecessarily the official rules.

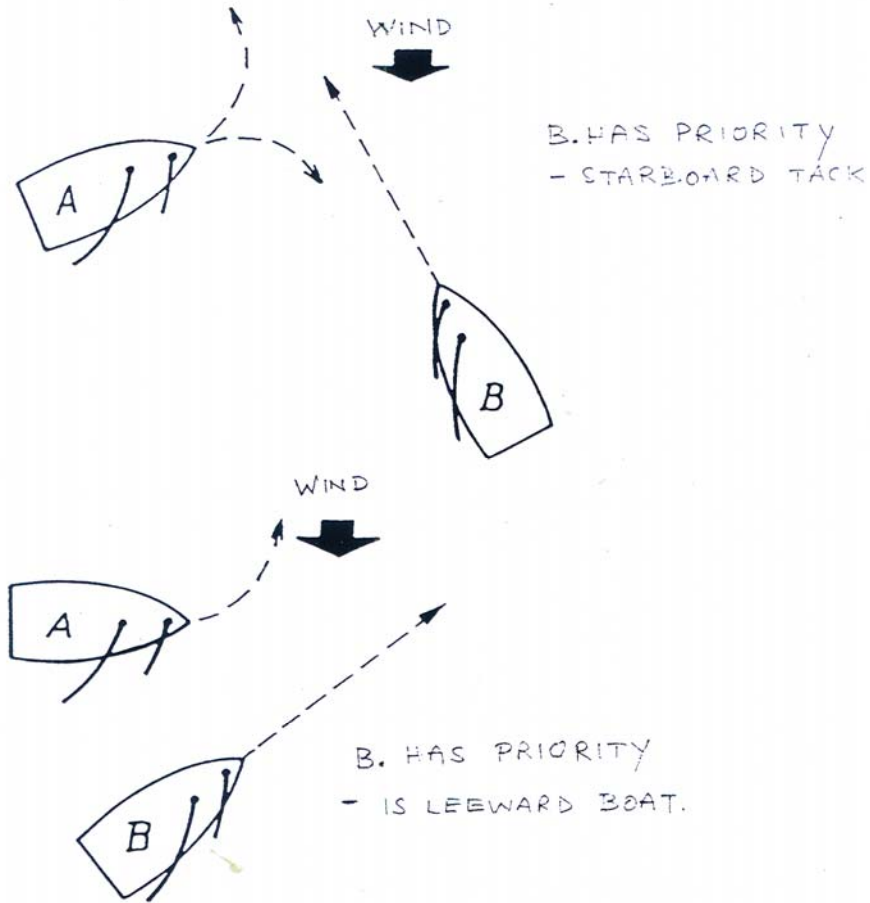


Fig. 21

## 4. Sail Trim and Stability

Now that the main manoeuvres have been dealt with, we will elaborate a bit more on the theoretical aspects of sailing in order to get a better understanding and appreciation of the influence of the trim of the sails and the importance of stability.

### 4.1 Action of the Wind on a Sail

The wind consists of moving quantities of air, the weight of which should not be underestimated, which hit the sails and rebound to go off in another direction, much like a tennis ball when it hits a racket. An elastic shock takes place molecules of air are deviated with a certain force and in turn an opposing force of the same strength affects the sail.

Considering the situations shown in the drawing: (Referring to Fig.22)

- a) The sail is not drawing, it spills; a few light whirls slow down the wind.
- b) The sail has been hauled in a bit to stop spilling. There is no more turbulence, air currents are smoothly deviated. A force  $F$  acts on the sail and balances the force  $F'$  which makes the air current diverge.
- c) The sail is hauled in a bit more, the deflection of the air currents is increased; the necessary action and consequently the reaction on the sail, are stronger.
- d) If we keep on hauling in, the force will continue to increase but air turbulence will appear.
- e) By hauling in still more, there will be a sudden change in the flow of air. Large whirls will be formed; air will be slowed down and diverted. The force on the sail will diminish. A change has been made from laminar flow to turbulent flow, and the sail is 'stalled'.

The effect of this transition is very important because it slows down the speed of the boat considerably. Easing of the sheets is not enough: one must almost go to the point of spilling to find a steady flow again.



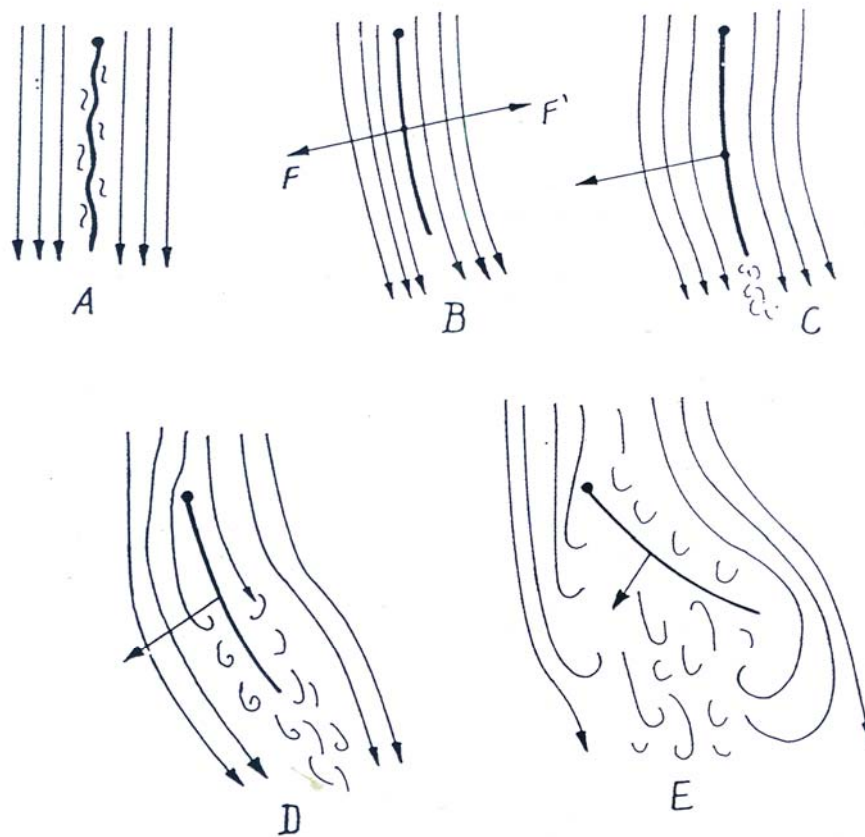


Fig. 22

## 4.2 Balance of a Sailing Boat

There are three ways in which a boat may react when one sails under reaching conditions with the tiller held straight:

- She may turn towards the wind (luffs) and one must pull the tiller (put the helm up) to keep the balance. In this case the boat is carrying weather helm.
- She tends to bear away and one must push the tiller away (put the helm down) to keep the balance. The boat is then carrying 'leehelm'.
- She stays on course even if one does not touch the tiller – this is called a balanced boat.

For maximum efficiency, the boat has to be balanced under all points of sailing; otherwise the force exerted on the rudder to keep it on course will act as a brake. In practice, it is almost impossible to obtain a perfect balance under all points of sailing and wind conditions. Generally speaking, a good boat, reaching with medium wind force, has slight weather helm and one must exert a slight pull on the tiller.

Let us now examine the settings and how they may influence the balance and thus the speed of the boat.

**Centre of effort of sails and centre board**

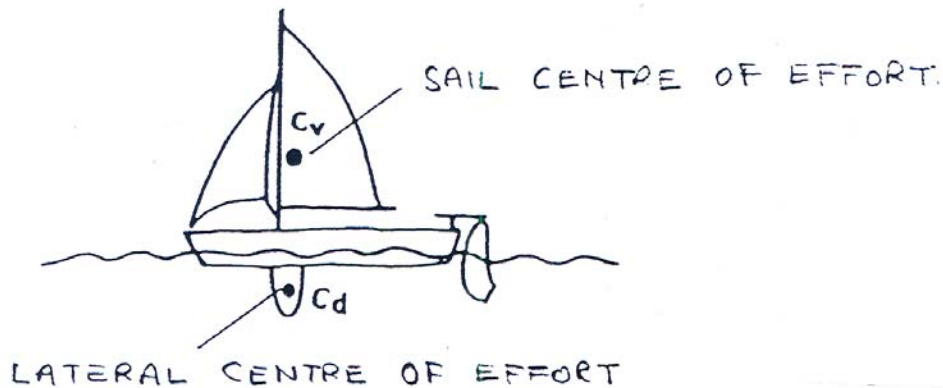


Fig. 23

The centre of effort of the sail  $C_v$  is the effective point of the combined pressure of the wind on the boat (jib, main sail, superstructures). It is located approximately at the centre of gravity of the sails' surface. Its location depends on the setting of the sails and the impact of the wind.

The centre of lateral resistance,  $C_d$ , is the effective point of the combined pressure exerted by the water on the hull and the centre board. It is located more or less at the centre of effort of the part of the boat under water.

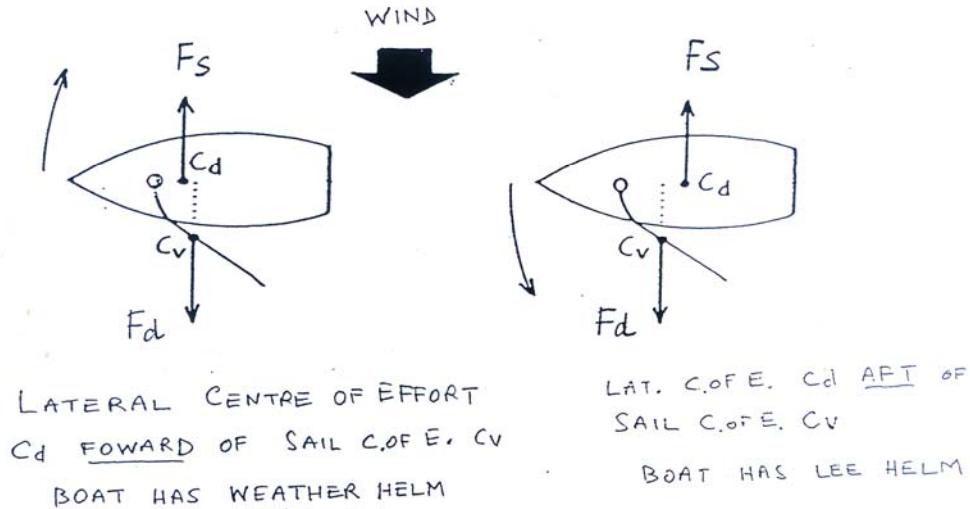


Fig. 24

**4.3 Stability**

A dinghy can capsize, that is to say it can heel over until the mast touches the water. Unless the mast is buoyant it will sink until the boat is completely upside down. To prevent capsizing, the crew must compensate the force of the wind on the sails by sitting out to windward. In the extreme case the whole body weight is positioned at the furthest distance outwards by means of the trapeze.

Figure 19 shows the principle of obtaining stability by positioning the weight of the crew.  $C_g$  is the resultant centre of gravity of crew and boat,  $C_r$  is the centre of effort of the boat's buoyancy. The distance between these two points produces a correcting movement. If the boat heels,  $C_r$  moves to the right and  $C_g$  is moved to the left by the crew sitting out further and thus producing a stabilizing action.

#### 4.4 Drift

The force  $F_d$  on the sails is uncompensated if the boat is not underway, and the boat drifts rapidly to leeward. Under sail the force  $F_s$  due to centreboard and rudder compensates  $F_d$  and reduces drift to about  $10^\circ$ . Thus when sailing close hauled, speed must be maintained, if necessary by easing the sheets and bearing away, in order to minimise drift.

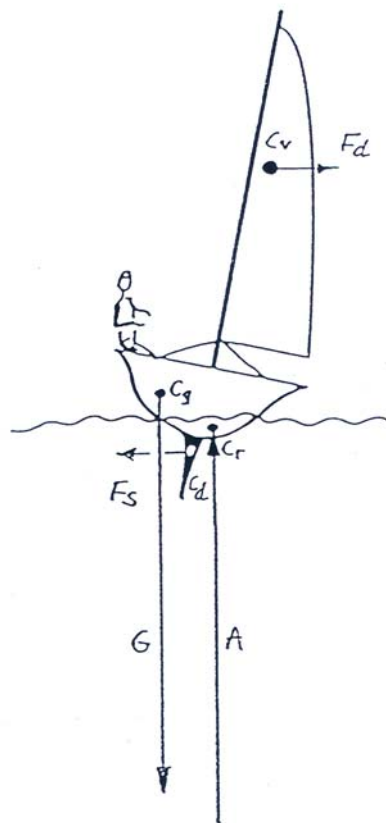


Fig. 25 Play of forces and moments

$C_g$  = centre of gravity of crew and boat

$C_r$  = centre of effort of hull buoyancy

$C_d$  = lateral centre of hydrodynamic forces

$C_v$  = centre of aerodynamic forces

$F_d$  = horizontal component of heeling force

$F_s$  = horizontal component of hydrodynamic force

$C$  = weight of boat and crew

$A$  = buoyancy

$C$  and  $A$  produce a righting,  $F_s$  and  $F_d$  a heeling moment. These two moments normally balance.

## 5. Trim Techniques and Effects

One of the objectives of every sailor is to get the boat to go as fast as possible without capsizing. The following trimming tips, typically for a 420, should prove useful.

### a) Trimming weight (hull trim)

- The crew should sit out so as to maintain the mast vertical. The boat will go faster and drift less to leeward.
- Crew sitting forward: in very light winds reduces wetted surface resulting in less friction and more speed.
- Crew sitting aft: with strong winds and waves, easier control; the boat is encouraged to 'plane'; under spinnaker aids in balancing the forward force on the mast.
- Crew sitting to lee: with very light winds, maintains the sail belly stable so as to catch every puff of wind.

### b) Trimming sail

- Freeing mainsheet: reduces heel, and reduces tendency to luff to windward.
- Freeing jib sheets: increases speed, can reduce lee helm.
- Spinnaker hauled in close: spi will swing less, but pulls less also.
- Jib halliard tightened: with medium to strong winds boat points closer to wind.
- Mainsail 'cunningham' hauled in: flattens mainsail and reduces heel. Can sail closer to wind in strong winds.
- Main halliard and outhaul tightened: mainsail flatter; can sail closer in moderate winds but with less speed.
- Top batten under tension: gives more belly to mainsail for light winds.
- Centreboard way up: when running before wind, less friction and more speed, but less stability.

## 6. Basic Knots

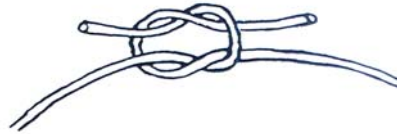
### A figure of eight knot

Obligatory at the ends of the sheets.



### A reef knot

Joins two ropes of the same thickness.



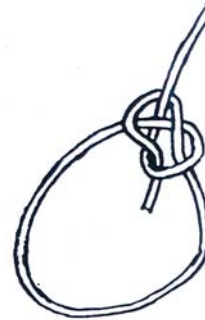
### Double sheet bend

Joins two ropes of different thickness.



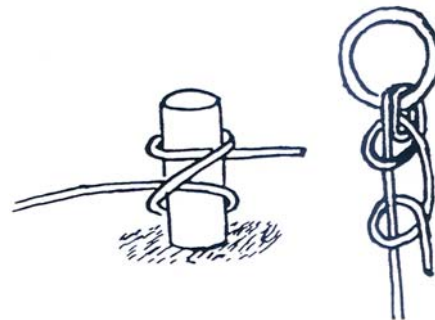
### Bowline

Much used when mooring and when taking a reef (“the little rabbit leaves its hole, turns around the tree, and goes back into its hole”).



### Capstan knot and a round turn and two half hitches

Used when mooring alongside a quay.

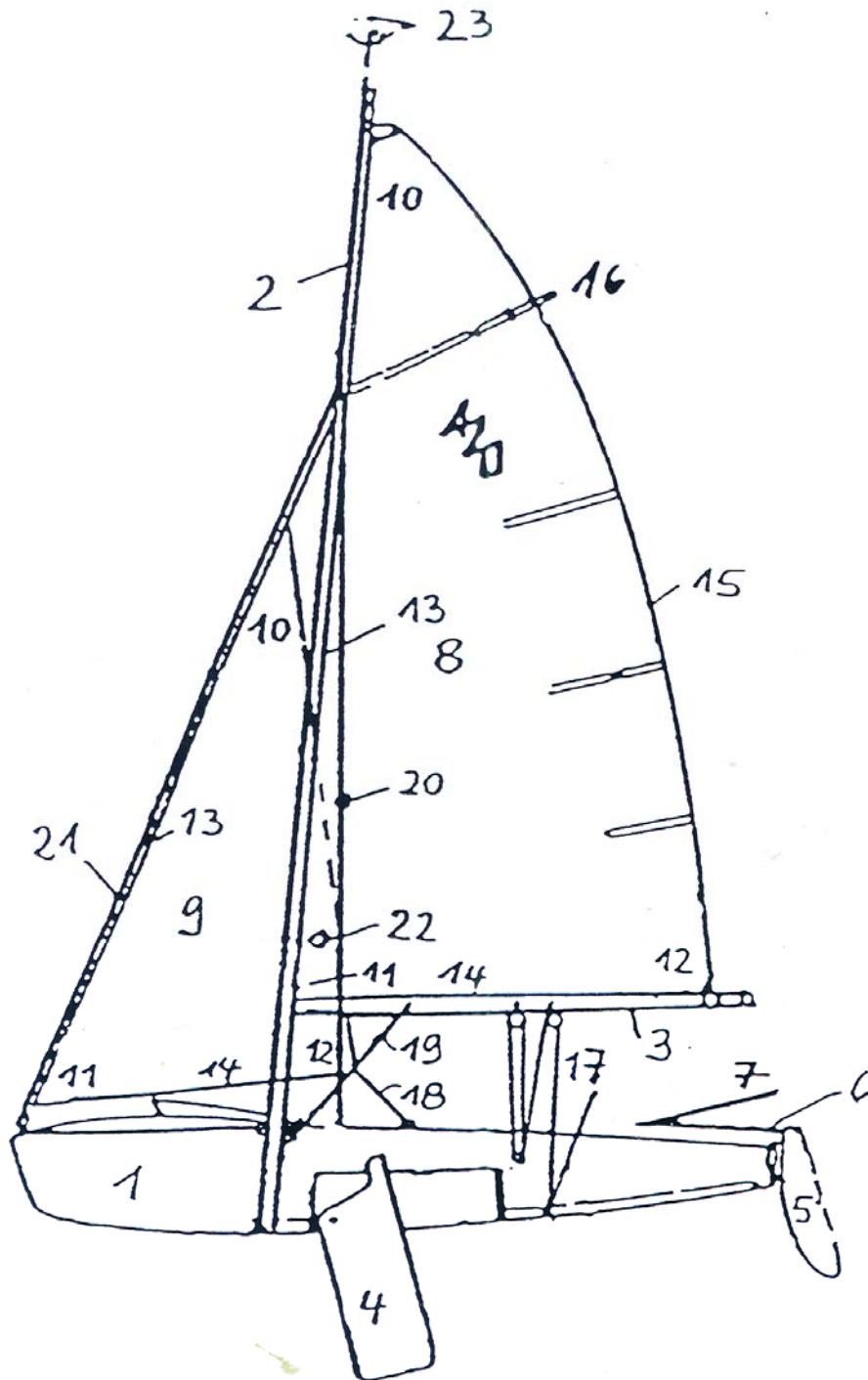


### Turning a cleat

Used to fasten the halliards. One empty turn of an eight, and a half hitch.

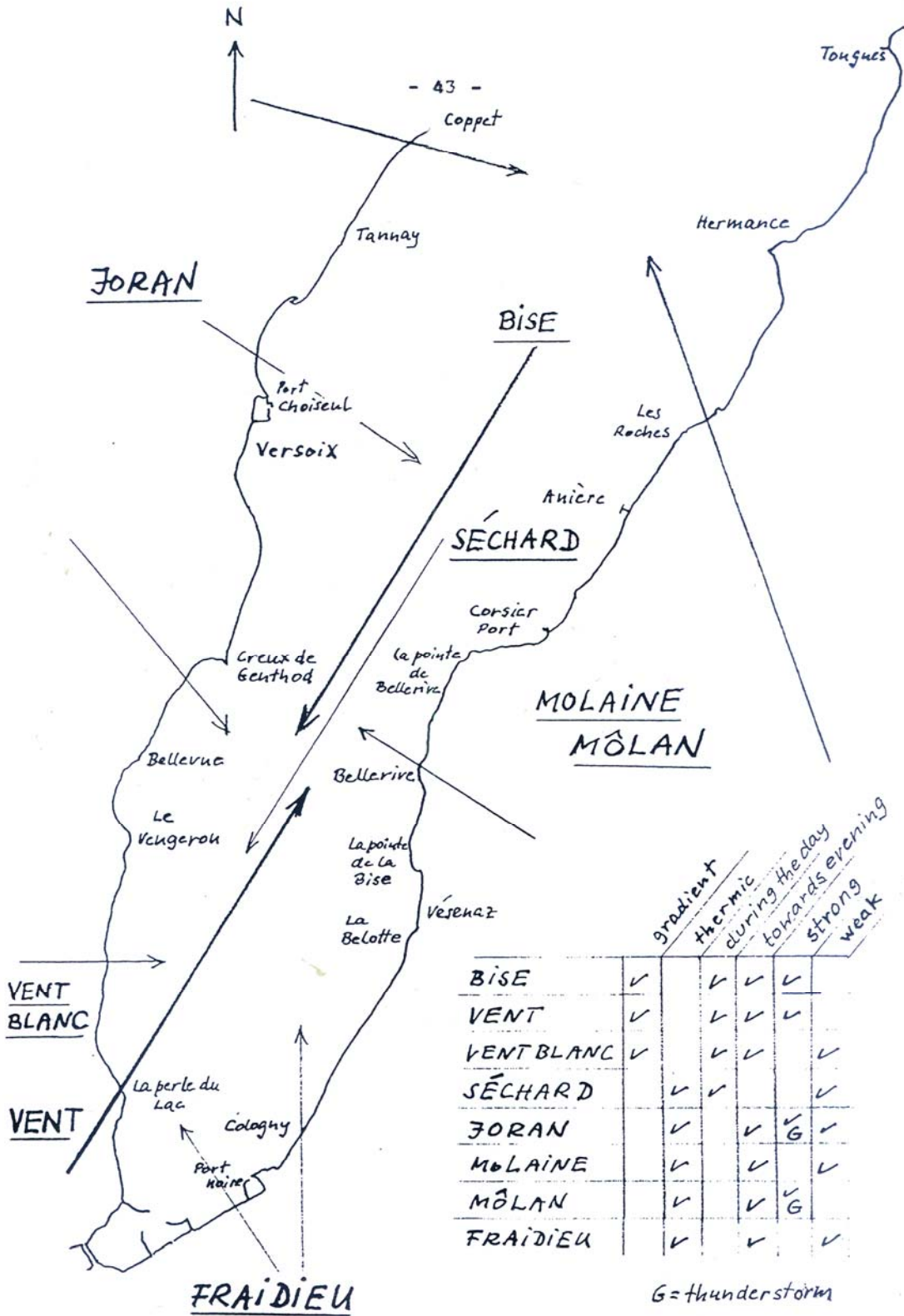


## 7. Sketch of a Dinghy



- 1.Hull 2.Mast 3.Boom 4.Centreboard 5.Rudder 6.Tiller 7.Tiller extension
- 8.Mainsail 9.Jib 10.Mainsail head 11.Tack 12.Clew 13.Luff 14.Foot
- 15.Leech 16.Batten pocket 17.Main sheet 18.Jib sheet 19.Kicking strap
20. Shrouds 21.Forestay 22.Cunningham eye 23.Burgee

## 8. Winds on the lake of Geneva



## 9. Sailing Dictionary

| English          | French           | Italian            | Nederlands              | German            | Spanish       | Polish                |
|------------------|------------------|--------------------|-------------------------|-------------------|---------------|-----------------------|
| Sailing points   | Allures          | Andature           | Zeilrichtingen          | Kurse             | Rumbos        | Kursy względem wiatru |
| close-hauled     | près             | Bolina             | aan de wind             | (hoch) am Wind    | Ceñida        | Bajdewind             |
| beam-reach       | travers          | traverso           | halve wind              | halber Wind       | Través        | Polwiatr              |
| broad-reach      | largue           | lasco              | ruime wind              | Raumschots        | Largo         | Baksztag              |
| downwind         | vent arrière     | vento in poppa     | voor de wind            | vor dem Wind      | Empopada      | Fordewind             |
| Rigging          | Gréement         | Parti di una barca | Onderdelen van een boot | Rigg              | Aparejo       | Osprzet i takielunek  |
| mast             | mât              | albero             | mast                    | Mast              | Mástil        | Maszt                 |
| spreaders        | barres de flèche | crocette           | zalingen                | Saling            | Crucetas      | Salingi               |
| boom             | bôme             | boma               | giek                    | Baum              | Botavara      | Bom                   |
| centreboard      | dérive           | deriva             | zwaard                  | Schwert           | Orza          | Miecz                 |
| rudder           | safran           | timone             | roer                    | Ruder             | Timón         | Ster                  |
| main sail        | grand'voile      | randa              | grootzeil               | Gross, Grosseegel | Vela mayor    | Grot                  |
| jib              | foc              | fiocco             | fok                     | Fock, Vorsegel    | Foque         | Fok                   |
| spinnaker        | spi              | spinnaker          | jager, spinnaker        | Spinnaker         | Spinnaker     | Spinnaker             |
| forestay         | étai             | strallo            | voorstag                | Vorstag           | Estay         | Sztag                 |
| backstay         | pataras          | paterazzo          | hekstag                 | Achterstag        | Burda         | achtersztag           |
| running backstay | bastaque         | sartia volante     | bakstag                 | Backstag          | Burda Volante | Baksztag              |
| shroud           | hauban           | sartia             | (staand) want           | Want              | Obenque       | Wanta                 |
| halyard          | drisse           | drizza             | val                     | Fall              | Driza         | Fal                   |
| sheet            | écoute           | scotta             | schoot                  | Schot             | Escota        | Szot                  |
| guy              | bras             | braccio            | loefschoot              | Achterholer (?)   | Braza         | Bras                  |



YCC Sailing Course for Beginners

|                   |                     |                        |                     |                    |                    |                   |
|-------------------|---------------------|------------------------|---------------------|--------------------|--------------------|-------------------|
| spinnaker pole    | tangon              | tangone                | spinnakerboom       | Spinnakerbaum      | Tangón             | spinnakerboom     |
| camcleat          | taquets-coinceurs   | strozza-scotte         | klemkikker          | Klemme             | Mordazas           | Knaga             |
| Parts of a sail   | Parties d'une voile | Parti di una vela      | Delen van een zeil  | Teile des Segels   | Partes de una vela | Czesci zagla      |
| batten            | lattes              | stecche                | zeillat             | (Segel-) Latte     | Sables             | Listwa            |
| clew              | point d'écoute      | punto di scotta        | schoothoek          | Schothorn          | Puño de escota     | Rog halsowy       |
| foot              | bordure             | base                   | onderlijk           | Fuss               | Pujamen            | lik dolny         |
| head              | point de drisse     | penna                  | tophoek             | Kopf               | Puño de driza      | rog falowy        |
| leech             | chute               | balumina               | achterlijk          | Achterliek         | Baluma             | Lik               |
| leech string      | nerf de chute       | ralinga                | ?                   | Jakobsleine        | Relinga            | Liklina           |
| luff              | guindant            | inferitura             | voorlijk            | Vorliek            | Grátil             | lik przedni       |
| reefing lines     | bandes de ris       | borose                 | reeflijnen          | Reffleine          | Mano de rizos      | Reflinki          |
| ?                 | ?                   | ?                      | leuvers             | ?                  | ?                  | ?                 |
| tack              | point d'amure       | punto di mura          | halshoek            | Hals               | Puño de amura      | Rog szotowy       |
| tell-tale         | penon               | segna vento            | tell-tale           | Spion/Windfaden    | Cataviento         | Icek              |
| Boat directions   | Directions          | Direzioni in una barca | Richtingen          | Richtungen an Bord | Direcciones        | Kierunki na lodzi |
| bow               | proue               | prua                   | (voor)stevens, boeg | Bug                | Proa               | Dziob             |
| stern             | poupe               | poppa                  | achtersteven        | Steven, achtern    | Popa               | Rufa              |
| starboard         | tribord             | dritta                 | stuurboord          | Steuerbord         | Estribor           | Prawa burta       |
| port              | bâbord              | sinistra (mancina)     | bakboord            | Backbord           | Babor              | lewa burta        |
| Manoeuvres        | Manoeuvres          | Manovre                | Maneuvers           | Manoever           | Maniobras          | Manewry           |
| to luff (head up) | lofer               | orzare                 | oploeven            | anluven            | Orzar              | Ostrzyc           |
| to bear away      | abattre             | puggiare               | afvallen            | abfallen           | Arribar            | Odpadac           |

|         |          |                         |                  |            |            |                            |
|---------|----------|-------------------------|------------------|------------|------------|----------------------------|
| to tack | virer    | virare                  | overstag<br>gaan | wenden     | Virar      | robic zwrot<br>przez sztag |
| to gybe | empanner | abbattere,<br>strambare | gijpen           | halsen     | Trasluchar | robic zwrot<br>przez rufe  |
| to haul | border   | cazzare                 | aanhalen         | dichtholen | Cazar      | Wybierac                   |
| to ease | choquer  | lascare,<br>mollare     | vieren           | fieren     | Amollar    | Luzowac                    |

## 10. Ten Golden Rules for YCC Dinghy Sailors

1. Before taking out a boat check its condition. Repair if possible any damage or deficiency mentioned in the logbook. If damage is found which cannot be easily repaired, contact the person responsible for maintenance without delay.
2. After removing the cover, check that all standing and running rigging and the centre board, rudder, etc. are in good order.
3. Before hoisting sail, bring the boat into wind. If the wind is strong, first get the boat into the water, preferably onto a buoy.
4. Hoist the mainsail and make fast the halliard before setting the boom. If the halliards jam, don't use too much force, bring the sail down and begin again.
5. Do not climb into the boat unless the hull is fully afloat.
6. Before casting off, check that the centreboard and rudder operate freely, that the tiller extension is fixed. Check that a life jacket for the helmsman and each crew member is aboard and that the paddle is present.
7. If the boat drifts into the harbour mooring chains after casting off, lower the sails immediately and paddle into clear water.
8. If the wind is blowing onshore, it is better to paddle out through the channel between moorings and pick up a buoy.
9. Similarly, when returning with an on-shore wind, lower the mainsail before entering the channel.
10. Before pulling the boat onto the trailer, lower the sails, raise and fix the centreboard and dismount the rudder.