



SCIENCE TEACHERS ASSOCIATION OF QUEENSLAND

MARINE SCIENCE SERIES



UNIT 8

INTRODUCTION TO BOATING

written by

R. MOFFATT

B. Sc. Dip. Ed.

DRAFT COPY Dec 1983

RATIONALE

There is a growing interest by Humanity to understand the world in which it lives, and the relationships that exist between different aspects of our world. The first space explorers viewing the earth from outer space described it as a "Blue Planet". This is not surprising since nearly three quarters of the earth's surface is covered by water. Many aspects of human endeavour have been and are linked to the Marine Environment.

Although some of the resources of the Oceans are already utilized for the benefit of Mankind, this represents only a small fraction of its potential. The circling sea is the source of water that makes possible all life on earth. Some Scientists and Engineers believe that the ocean holds the key to the future needs of Mankind in the form of food and mineral resources. In the future some countries may build cities under the sea.

The importance of Australia's marine environment is emphasised by its Geographical position as an Island-continent, and enlarged by the declaration of the 200 mile sea and the zoning of the Great Barrier Reef. Since 75% of Australians, and over 80% of Queenslanders live within one hour's drive from the sea, a study of the Marine Environment is of importance to our society. This importance is magnified by the fact that we have over 86,000 registered power boats in Queensland.

Studies relating to the Marine Environment are important in respect of:

- (a) natural resources
- (b) influence on weather and climate
- (c) involvement in trade and commerce
- (d) potential for recreational use
- (e) employment prospects
- (f) military and historic significance
- (g) specialist technology

This unit is one of a series that seeks to develop a coordinated approach which will enable students to study the Marine Environment.

© 1984 S.T.A.Q. Publications and R. D. Moffatt

All rights reserved. No part of this publication may be reproduced or transmitted in any form or by any means without permission. All profits from the sale of this material go to S.T.A.Q.
First Published 1984 by STAQ Publications c/- Brisbane Education Centre, P.O. Box 84, Spring Hill, Q4000.

The National Library of Australia
Cataloguing-in -Publication data:
ISBN

Draft no number yet

For further information contact:

R. Moffatt
Benowa State High School,
Mediterranean Drive,
Gold Coast, Q. 4217.

INTRODUCTION TO BOATING

AN S.T.A.Q. MARINE SCIENCE MODULE

written by

R. D. MOFFATT

FIRST DRAFT

Acknowledgements: Boris Danilenchko, Irene Ingold, Nick Viner,
Jacobs Well Field Study Centre.
Jim Baker, Gladstone State High School

Note: As this is first draft material comments would be gratefully received
Gladstone or Benowa State High Schools. The Unit will be available
for sale in June 1984.

Grateful thanks to the following for allowing S.T.A.Q. to
reproduce their work.

Clark Boats, The Marine Board of Queensland,
The Department of Harbours and Marine and
their Small Ships Manual, The Boating and
Fisheries Patrol and their Pamphlets on Small
Ships and Safety, The Tide Book,
Queensland Maritime Museum, The Queensland
Teachers Journal, Mariner Outboards,
The Commonwealth Bureau of Meteorology,
Johnson Outboards and Manual, F.U.S.E Aust.,
Evinrude.

This Booklet was made possible with the support of the following
Education Department Personnel:

C. Connell (Brisbane South Regional Office)

J. O'Connor & L. Sampson
(STEP Project, Education Dept.)

INTRODUCTION TO BOATING

WHY STUDY THIS UNIT?

Ever since our early colonial days, people in Australia have depended on the sea for their livelihood. Today, the Sea is still used for many purposes. Queensland has a high involvement in maritime activities at Recreational, Tourist, Fishing, Research and Constructional levels.

Over 86,000 power boats are currently registered and over 2,000 charter and fishing vessels operate out of Queensland ports. With such a large number of craft there is a need for all people using the Sea to have a working knowledge of the vessels that operate in its waters.

When people buy a boat there are many pitfalls. Section 1 looks at the logistics of buying the boat you want for your needs.

Because boating is usually a recreational activity, people tend to relax more. Unfortunately so does their attitude towards safety. Section 2 looks at the equipment that is compulsory, why it is so, and offers some ideas on general safety.

Section 3 considers the practical aspects of Seamanship that a person should have in order to start boating. Unfortunately there is no teacher like experience, and this is only a very limited introduction.

Whether you like it or not, repairs will have to be done. The sea is not a kind lady when it comes to wear and tear and so Section 4 has some hints on Care and Maintenance.

To operate a power boat in Queensland with a motor over 6 hp. requires a licence. Section 5 gives you the necessary information to obtain the licence and offers some practical hints as to how you and your teacher may pursue this further.

CONTENT

The student shall have a knowledge of:

1. Methods used to buy or hire a boat.
2. Boats and the materials used in them.
3. Deck fittings, sail types and basic navigation equipment.
4. Boat motors, fuel types and tanks and fittings.
5. Boat and trailer maintenance.
6. The boating rules and general boating safety.
7. How to get a boat licence.
8. Basic First Aid.

PROCESS

The student shall be able to:

1. Distinguish between a good and a bad buy when purchasing a boat.
2. Understand manufacturers' pamphlets and obtain retail prices from them.
3. Use the Tide Book to obtain Tides, Boating ramp and other information.
4. Understand a weather forecast and read a weather map.
5. Read and understand labels on bottles, cans and tubes.
6. Follow written instructions on bottles, cans or tubes.
7. Use a claim form or understand the terms in a warranty contract.
8. Follow a workshop manual and know basic use of tools.

SKILL

The student should be able to:

1. Tie basic knots and lashings.
2. Prepare a power boat for sea, launch it and operate it under power.
3. Prepare a sailing boat for sea, launch and sail it.
4. Demonstrate regular maintenance on motors, sails, hulls, batteries.
5. Use and maintain a trailer.
6. Demonstrate use of all safety equipment, and basic first aid at sea.
7. Use a marine radio to send and receive messages.

ATTITUDE

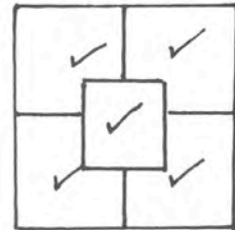
The student should:

1. Value the need for the boating rules and obey them at sea.
2. Develop a safe attitude towards the sea.
3. Realise that alcohol and water do not mix and contribute to accidents.
4. Be helpful to others at sea and display a helpful attitude.
5. Be mindful of the costs of seagoing craft and other people's property.
6. Be tolerant of those who get seasick and be sympathetic.
7. Cooperate with those who try to uphold the boating rules.
8. Respect weather forecasts, heed strong wind warnings and dangerous bar crossings.

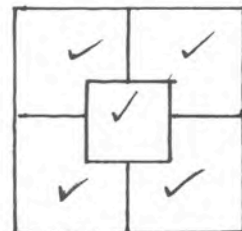
This module has 5 sections:

1. Buying a Boat

P 5

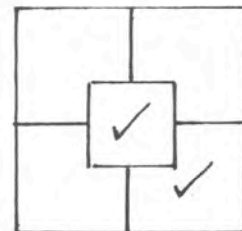


2. Boating Safety and Survival P 23

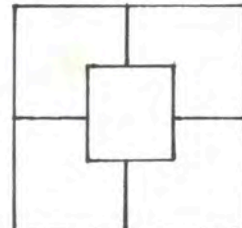


3. Seamanship

P 39

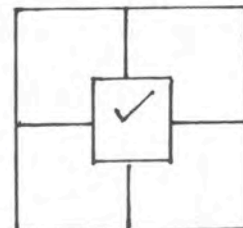


4. Boat Care and Equipment Maintenance P 65



OPTION Getting your power boat licence

P 80



REFERENCES

- Toghill, J. "The Boat Owners' Maintenance Manual",
"Sailing for Beginners",
"Trailer-sailers",
"Power Boating", Reed, Sydney.
- Marine Board of Queensland "Small Ships Manual", revised edition,
Department of Harbours and Marine.
"Encyclopedia of Australian and
New Zealand Boating"
- Prince, J. H. "Small Boats - maintenance, handling,
navigation", Angus & Robertson, 1968.
- Andrews, H. L. & "Basic Boating - Piloting and Seamanship",
Russell, A. L. revised edition, Prentice-Hall, 1974.

AUDIO-VISUAL RESOURCES

Films The Boating Patrol Education Officer,
Department of Harbours and Marine,
Post Office Building,
Cnr. Edward and Margaret Streets,
Brisbane, Q.4000.

Phone: 227 8864

V.C.R's Write to the Marine Section
Technical and Further Education
Manning Street
South Brisbane

LIGHT AND DEPENDABLE.



Here's proof

EVINRUDE
FIRST IN OUTBOARDS

MIAMI BOAT SHOP
2182 GOLD COAST HWY.
MIAMI
351 320

**Safety
Equipment**



**THE ONLY THING MORE AT HOME
IN THE WATER HAS GILLS.**



DEPARTMENT OF HARBOURS AND MARINE QUEENSLAND



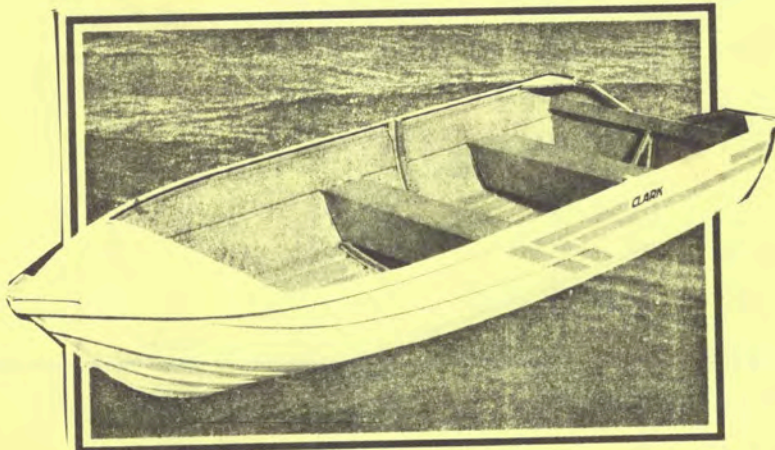
HYDRO MARINE
43 ROSS ST.,
NEWSTEAD, 4006
PH. 52 1416

SECTION 1: BUYING A BOAT

<u>PRACTICAL ACTIVITIES</u> 1. Buoyancy 2. Naming Toy Power Boat and sailing boat parts	<u>STUDY ASSIGNMENTS</u> 1. Write to manufacturers and retailers for catalogues 2. Working through a boat catalogue 3. Australia II and her keel 4. Boat and Sailing Clubs
<u>CORE</u> 1. Logistics in Buying a boat 2. Power Boats 3. Sailing Boats 4. Canoes	
<u>DIRECTED TOPICS</u> 1. Buying a Boat - exercise 2. Class Debate: Power v's Sail 3. Class Discussion 2nd hand v's new	<u>AUDIOVISUAL</u> 1. "Buying a Boat" - 16mm film 2. Selected T.V. Boat Programmes

Section 1: Buying a Boat

OBJECTIVES	RESOURCES	
1. C. Use a newspaper to locate the "For Sale - Boating" Section.	Newspaper red phone, 20¢ coins phone book stationery notes p. 9 notes p. 10 notes p. 13 class discussion study assignments	
2. C.P. Compile a list of Boats for Sale and their phone numbers		
3.P.S.A. Decide on a short list and make phone calls to ascertain price.		
4. P.C. Compile a list of boat manufacturers from the yellow pages of the Telephone Book.		
5. S.P. Write, address and post letters to manufacturers for catalogues and prices.		
6. C. Recall 4 types of Hull Shape and their characteristics.		
7. C. Recall 2 types of propulsion systems and 2 types of sailing rigs		
8. P.C. Distinguish between planing and displacement hulls.		
9. P.C. State the advantages and disadvantages of number 8.		
10. P.A. Decide on a craft you would buy in adult life.		
11. P.A. Decide on a budget, how much you would have to earn, and consider repayments v's cash payments.		
12. P. You will be expected to apply the knowledge gained in this section to new situations.		
13. C. You will be expected to spell and sue correctly the following words:		
CHARACTERISTIC	HYDRODYNAMIC	SCHOONER
PROPULSION	CATAMARAN	SLOOP RIG
CATEOGRIZE	CONSUMPTION	GENOA
ECONOMICAL	PLANING	TONNAGE
KEEL	ACHIEVING	BILGE



CORE

1. BUYING A BOAT (Ref. objectives 1 - 5)

Most people buy their first boat new or second hand. There are advantages and disadvantages for each.

Some advantages of buying a Boat - new

1. Nice to look at
2. Feeling that nothing will go wrong
3. Prestige
4. Guarantee

Some disadvantages of buying a boat - new

1. Expensive
2. Repayments could put a strain on budget
3. Warranty problems
4. Insurance High
5. More likelihood of being stolen

Some advantages of buying a boat - secondhand

1. Cheaper
2. Feeling of getting a good deal
3. Insurance cost lower
4. Less likelihood of being stolen.

Some disadvantages of buying a boat - secondhand

1. Could buy a heap
2. No guarantees
3. Could be stolen
4. Could be expensive to fix up.

CAN YOU THINK OF ANY MORE?

In this first exercise you are going to see if you can buy a boat.

What to do:

Time required: 2 periods

1. Divide the class into those who buy it new and those who would buy secondhand
2. "New" Groups is to use the phone book and the newspaper; the "old" group uses the newspaper.
3. Use these 2 resources to get the best deal possible.
4. Complete objectives 1 - 5.

Activity Guidelines

1. Make up a list of points to consider and discuss them with your classmates.
2. Find out how to use the newspaper, yellow pages, and phone directory.
3. Find out how to use the phone and make a list of things you want to say or questions you want to ask.
4. Remember to be systematic and write everything down.
5. Find out about warranty, guarantees.

Class/Group Debate/Discussion

1. Check with your group on the jobs you are going to do.
2. Report back to other group members your deal.

For example: The "new" group may be able to obtain a 16ft. runabout for \$4,500 with 12 months warranty.

The "old" group may be able to get the same for \$850 but with no warranty.

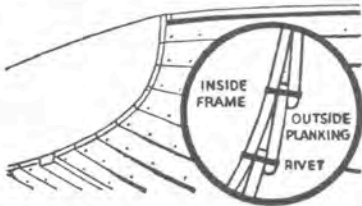
Which is best?

What are the pitfalls?

BOATS, MARINE	700
AAA Mariner outboards — specials — trade ins are welcome at SPORTSMANCRAFT Marine 356 3873. ALUM. "STACER" BOATS, HYDRO 52 1416 ALUM 12' Clark 25hp elec Yamaha trier \$1550 370 1408 BOAT DETAILING from \$100 HYDRO MARINE 52 1416. BOAT SCREENS , boat windows by A.J. Plastics all types, repairs, insurance quotes, perspex cut to size 262 2384	
BOATS WANTED - CASH TODAY I will inspect. Phone Peter Neale 396 3135.	
BOATS wanted cash buyers waiting phone 209 1136. BOAT TRAILERS FACTORY PRICES, HYDRO 52 1416 BONDWOOD 14ft 15hp Evinrude mtr complete with trailer, apply flat 5, 37 Wharf St, Kangaroo Point.	
CATAMARAN Cruising Racer, large central cockpit, sleeps 4 in 2 cabins, 5 sails, at new auxillary. Urgent sale, \$10,000. Contact Wayne Tibbles EAST COAST SHIP BROKERS 393 3811 AH 349 3206, 242 Royal Esplanade, Manly. Open 7 days.	
DIESEL CRUISER 25ft 57hp Ford Lees motor, hyd gear-box, Furuno sounder, elec. winch, 2 elect. bilge pumps, 2 sets of batteries, 1 alternator, 1 generator, complete galley, marine toilet, shower recess, frig, hws, pressure to all points, gas stove, Western ship to shore radio, 27 meg transceiver, radio cass, life jackets, flares, fire extinguishers, \$19,000. Contact Caloundra (071) 92 1054.	
EVINRUDE Outboards. Try us for best deals. MIAMI BOAT SHOP (075) 35 1666 Open all day Saturday.	
FIBREGLASS Materials. THE FIBREGLASS CO. 48 Abbotsford Rd, Bowen Hills. 52 5552.	
HAINES HUNTER Try us for best deals. MIAMI BOAT SHOPS (075) 35 1666. OPEN ALL DAY SAT.	
LOCK-UP half cab. Nova 5 metre, canopy, slide and storm curtains, all safety gear 80 hp Merc, low hrs, multi roller trailer, 1st class cond. \$4,500 no offers. Ph 396 3147.	
OUTBOARD SERVICE - All brands - HYDRO MARINE, NEWSTEAD 52 1416 - MARGATE 283 2984.	
SEAWORTHINESS INSPECTION BE SAFE Spend \$25 at HYDRO MARINE NEWSTEAD Phone 52 1416.	
SPORTSMAN Craft V157 runabout, as new, 55hp outboard, 6hp aux, f/controls, Redco trailer, p/winch, Flin. avail. \$3,990 ono. Alan 284 9244 AH 203 6644.	
TRADE YOUR BOAT ON A QUALITY USED VEHICLE AT BRISBANE DISCOUNT MOTOR MARKET. PH TREVOR MOORE 350 1233 A.H. 245 4858.	
TRAILER-SAILER bilge keels, sleeps 2, 4 sails incl. spinaker, 2 o/b trier, etc \$1900. Noel Ash EAST COAST SHIP BROKERS 242 Royal Esp., Manly 393 3811.	
WANTED Haines 565L or 17L with 140hp Johnson or Evinrude. Phone Gary 284 1188.	
WANTED URGENTLY f/glass or alum. runabout or half-cabin boat to \$2,000, will repair if necessary. 245 4584.	
WE BUY BOATS FOR CASH - HYDRO MARINE WE SELL BOATS FOR OWNERS PH. 52 4203, 283 2984	
YACHT 25' f/glass sleeps 6. Radio, sounder, auto pilot, dinghy, mooring available. \$13,500. Ph 393 4436.	
\$950 Buys 12' Clarke alum. runabout on steel trier, 20 hp Johnson, 535 Boston Rd, Chandler.	
30' DISP. MV Carvell hull s.s. refrig, Marine head, Galley, CB radio, Full instruments, Sleeps 6 Excell. floating holiday home, Dry inspect \$11,500 ono. Ph 286 1453.	

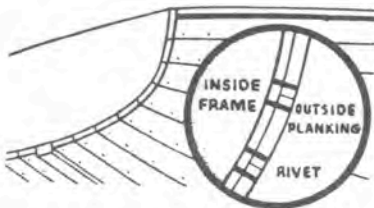
2. POWER BOATS (objectives 6 - 8)The Shape of Things

A Clinker-built hull is made of wood, is gently curved, is usually expensive and is not a normal construction method for a hull longer than 9.13m (30ft.) Because of its shape and weight, a clinker boat is generally of the "displacement" variety.



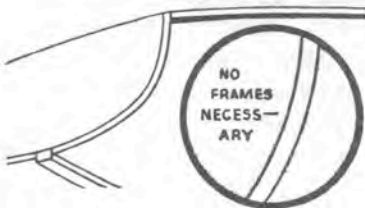
The planks run longitudinally from bow to stern, each overlapping its neighbour. The planks may be glued or copper rivetted along their sides.

A carvel hull is also made of wood and is used for all kinds of boats, from dinghies to minesweepers; but because of its inherent weight and expense, it is not usually found on a boat under 6.09m (20ft) long intended for high speed use.



The planks, running either longitudinally or diagonally from deck to the keel, butt against each other giving a smooth finish.

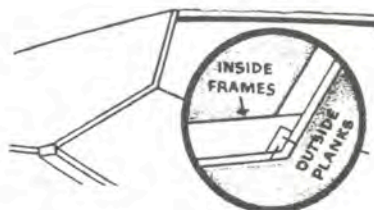
Moulded Construction employs metal, wood, plastic or glass fibre and is thus regarded as ideal for many of the cheaper processes of building. It can be light in weight yet strong, so your runabout will probably use this form of construction.



Sheets of thin veneer, glass fibre or other plastic material are moulded and bonded together. Light and strong, this gives a smooth finish.

Hard chine is more s shape than a method of building. It commends itself to the 'do-it-yourself' method because practically any material can be used, and as a shape, it is easier to construct than any other. Moreover, hydrodynamically, it is extremely efficient.

The sides make an angle (the chine) with the bottom.



As in aircraft design there is the sound barrier, so with boats there is the 'water barrier', which, for the average runabout, might be about 5 m.p.h. That is, to attain a speed greater than 5 m.p.h. the boat must rise out of the water and plane across the surface of it, thus reducing the area of friction and drag (Fig.5).

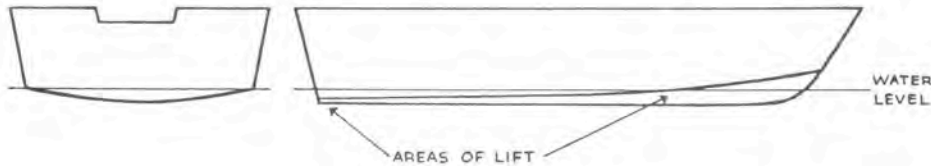


Fig. 5 Planing hull.

If the design of the boat will not permit it to plane, then it becomes a displacement hull (Fig.6) so called because it displaces its own weight of water as it moves forward.

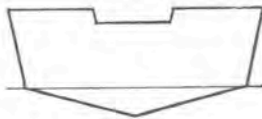
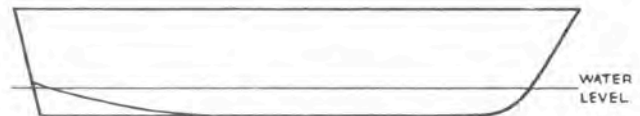


Fig. 6 Displacement hull.



So we have two major categories of design - the displacement hull and the planing hull. Which is the better? That question brings us to the use to which you mean to put the boat.

The full-planing, hard chine hull has the advantages of speed and economy of power - but it is not a particularly sea-kindly design, and becomes hard to handle in adverse weather.

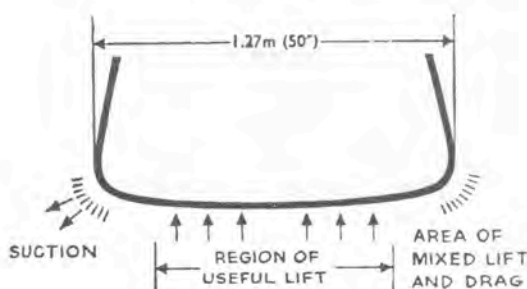


Fig. 7 Semi-chine hull.

Fig.7 shows the compromise known as the semi-chine, where the main advantages of the hard (good speed, power economy) chine have been maintained, together with the steadying roundness of the displacement hull. This design is favoured by water-skiers as the boat tends to bank more on the turns, thus counter-acting the centrifugal force exerted on the stern by a skier pulled at the end of a 21.33m (70ft.) rope.

There are, too the specialised shapes such as the stepped hull of a racing boat, which merely skims the surface of the water on two points of contact; but these, along with hydroplanes, hydrofoils and the like, are beyond the scope of this text written for the average newcomer to the more usual aspects of motor-boating.

The fastest boat in the bay is not much use if you cannot open the throttle in a wind above 10 m.p.h., or if there is a speed limit, or if you are only a beginner. Thus it is essential, before buying, to consider carefully the uses of the boat, and the places where it will be operating in order to make a sensible compromise of cost with economy, portability and adaptability.

Motor boats come into one of three general categories:

(i) Launches or Runabouts, open vessels fitted with either outboard or inboard engine. Some of these are of the speedboat variety.

(ii) Motor cruisers ranging from 7.61m to 18.28m (25 - 60ft) or more in length and designed for the owner who cruises, living and sleeping on board in comfort. These may be powered by either petrol or Diesel inboard engines.

(iii) Auxiliaries, which are really sailing yachts, but are fitted with an auxiliary engine.

Some fortunate owners are in a position to have their boat specially designed and constructed, but the average owner chooses his from the saleroom of a city dealer or from the variety offered by hull builders, perhaps in their advertisements in the boating and yachting Press; or he will select a second-hand boat from a boatyard or through the 'For Sale' column. Some handymen may buy a ship's lifeboat or similar craft and convert it to a motor cruiser by a do-it-yourself job, or have it professionally converted.

The best method of choosing a boat to suit your own requirements is, if possible, to make friends with the owner of that type of craft and persuade him to take you on a trip or two. Useful as books and catalogues are to the prospective purchaser, the ideal way to learn about boats and their qualities and shortcomings is to gather with boating men. The same advice applies to the owner who desires to become proficient in handling his boat.

ENGINES

The choice of engines is practically unlimited and the first-time purchaser faced with the problem of having his new boat fitted with engine and accessories of his own choice, is filled with confusion. It would be so much easier if boats came 'complete', like cars.

First, he must decide which type of engine he wants, and there are four broad categories: outboard, inboard, outboard/inboard and 'specials', i.e. jet and electric. We will consider the first three types.

The Outboard engine (Fig.8) so called because the complete unit is hung over the stern of the boat, has certain appealing advantages.

- (a) It is easily removable for maintenance, storage, etc.
- (b) Most outboards automatically tilt if they hit an underwater obstruction and so are not readily damaged.
- (c) Slung astern, they occupy no space in the boat.
- (d) The cost is less than for an equivalent inboard unit.

Against this consider the following points, which are disadvantageous:

- (a) Running costs are greater than with an inboard.
- (b) It is possible for the engine to fall off while running or be removed in the owner's absence.
- (c) An outboard is less protected from the elements and from damage by collision.

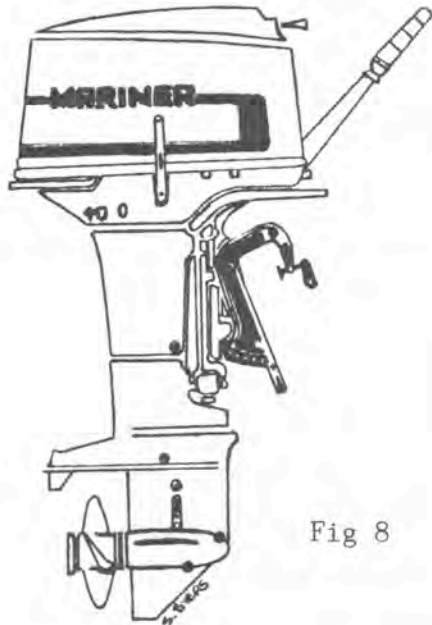


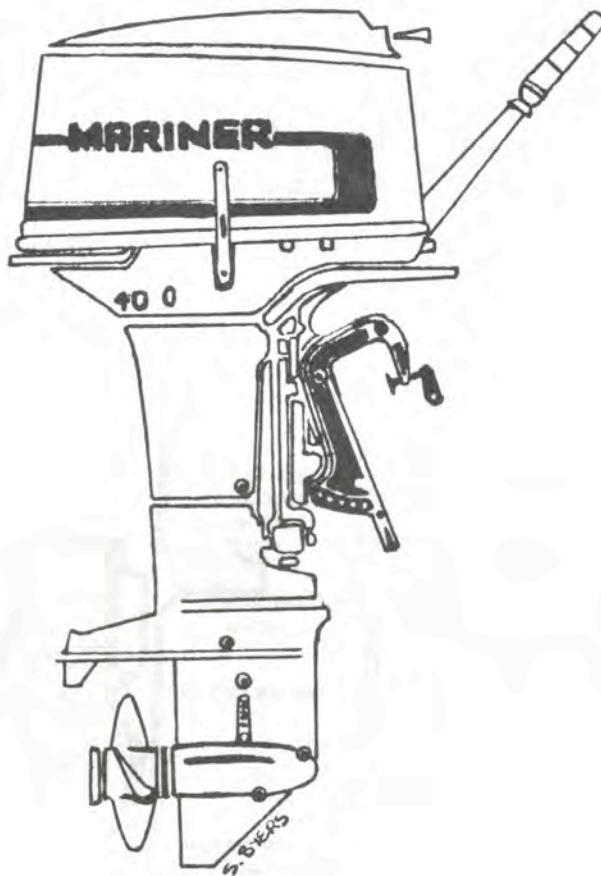
Fig 8

With one exception, outboards are of the two-stroke design i.e. fuel and lubricant are mixed and transferred together to the engine. In the normal car engine, the oil added independently, may recirculate around the engine for several thousand miles before requiring replacement; thus, for an outboard, the additives often found in motor car oils are useless, and 'soot' the plug. You are therefore advised to buy a recommended two-stroke oil for adding to your petrol in the proportions recommended by the outboard manufacturer.

Inboard engines offer many variations in speed and power but require three holes in the boat hull for (a) cooling water intake, (b) exhaust and cooling water outlet and (c) propeller. The latter must be aligned very carefully with the engine or excessive wear in the bearings will immediately occur.

The outboard/inboard engine is a comparatively new development and normally employs a standard inboard engine, mounted on the inboard side of the transom, with the gearbox, shafting and propeller mounted outboard of the transom and connected with the inboard section through a hole bored in the transom

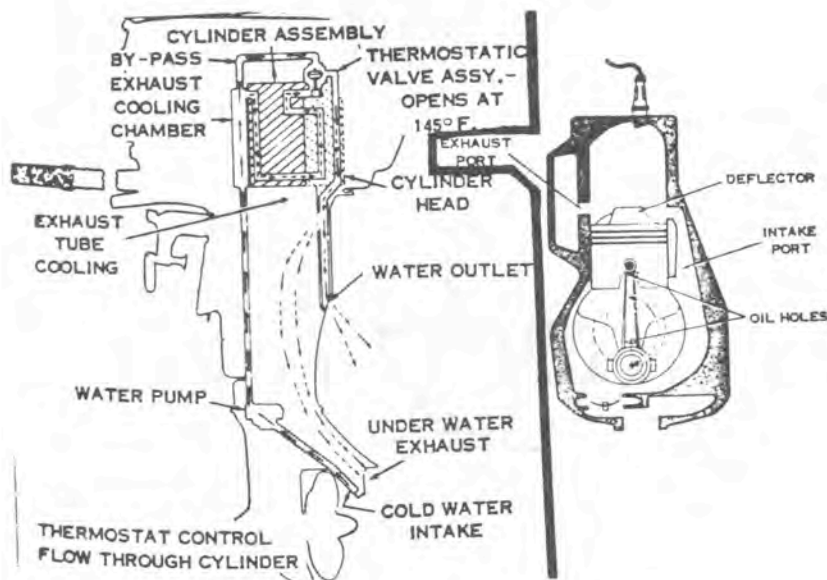
The outboard section can swivel clear of the bottom line of the boat for beaching or, while running, to avoid serious damage from driftwood or underwater obstruction. By combining the design of outboard and inboard, it also combines many advantages of each. More economical in running costs than an outboard, it is less expensive to install than an inboard engine.



ACTIVITY

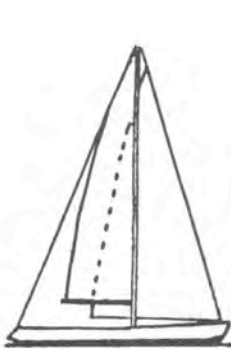
The difference between planing and displacement hulls

1. Copy the figures on planing and displacement hulls on page 11
2. See if you can calculate the area (roughly) above and below water for the Planing v's the Displacement hull.
3. Now draw what you may expect to find above deck in Figure 1 and Figure 2.
4. Which would go faster? Which slower?
5. Which has the deeper DRAFT?
6. Which would be the more economical to run?
7. Which would be the better to put in a large pay load? Why?
8. Where would you put a motor in Fig. 5? Where in Fig. 6? Draw it in.
9. Where would you put a sail/mast in Fig. 5 and Fig. 6? Why?
10. Which would have virtually no hydrodynamic resistance when travelling fast?
11. What factors need to be considered when matching a boat and a motor ?

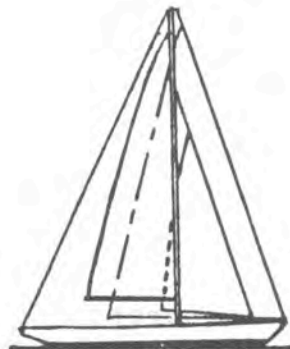


3. SAIL BOATS

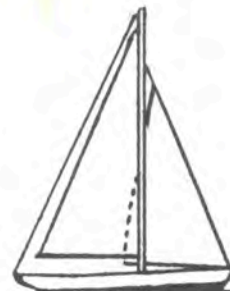
Generally speaking, modern sailing craft can be identified by the type of sail plan they carry. Fig. 4 shows a few different types.



Masthead sloop



Masthead cutter



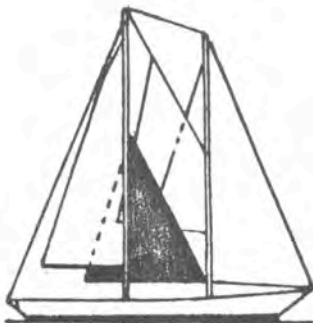
Three-quarter sloop



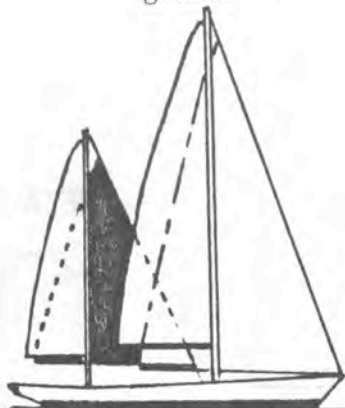
Lug

Sliding
gunter

cat



Schooner



Ketch



Yawl

S.D. 1943

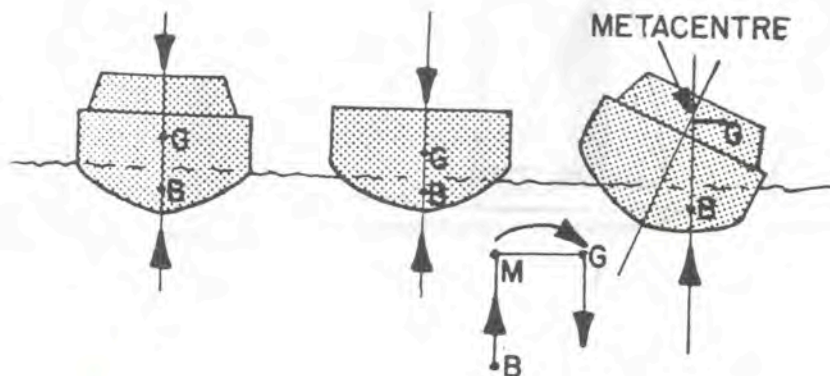
Fig 4

Practical Activities

1. Perform an experiment on buoyancy.
2. Make model boat shapes as mentioned in the core sections.
3. Make a model boat as a project illustrating the difference between schooner, cat rig, sloop rig, cutter, ketch. You could use cardboard cutouts.
4. Make a raft and enter it in the local raft race.
5. Make a scale model boat and race it.

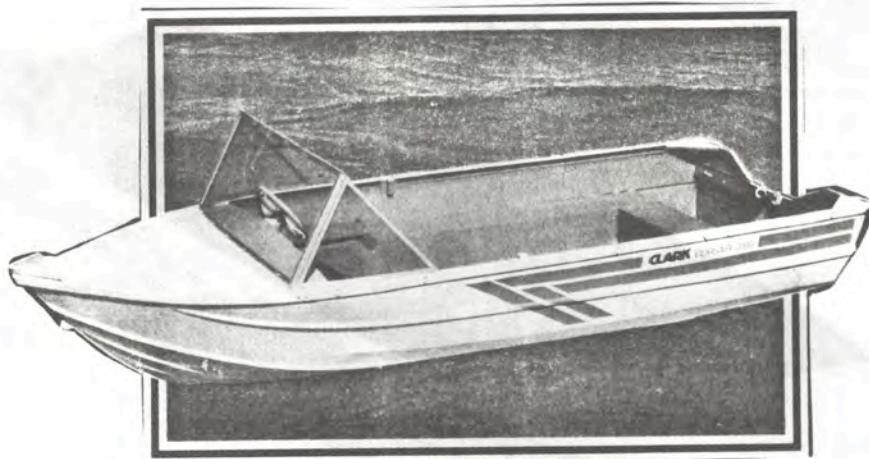
Audio Visual

1. Write to the boat manufacturers you discovered in the Core and see if they will lend their promotional films or videos. See if you can obtain permission to copy them.
2. Find out when the boating programmes are run on television. See if you can watch them.



Study Assignments

- A. Study the Clark Aluminium Pamphlet /over.
1. List 19 advantages of using aluminium.
 2. What is different about the Corsair Runabout and the Cutter deluxe ?
 3. Which boat would fit on to a car top?
 4. Which boat would need a trailer?
 5. What is Dry Rot?
 6. List 5 advantages of their particular warranty.
 7. What is the Brisbane Telephone number of Clark.
 8. Ring them up and ask them the price on their punts.
 9. Could you lift 34.5kg?
 10. Is floatation material included in all models?
 11. What is a long shaft transom ? What is its advantage ?
 12. What are specifications ?
 13. What is the recommended power for the Cutter?
 14. Does the Corsair have a center opening windscreen available ?
 15. What sort of hull do the three boats have ?



CLARK

(19)

Courtesy Clark
Brisbane

CORSAIR RUNABOUT (3.96m)

Forward control runabout, welded heavy duty construction with additional strengthening ribs, longer foredeck, two side and two cross seats with side pockets. Excellent weight distribution provides first class handling. Comfortably tows child skiers with 17.7kw (25hp) outboard.

Specifications:
3.96m x 1.57m x .61mm.
Recommended max power up to 17.7kw (25hp). Wt.: 91kg. Standard boat painted and fitted with windscreen and steering. Long shaft transom available*. Centre opening, windscreen and long shaft models available as optional equipment.

CORSAIR (3.96m)

Heavy duty welded construction

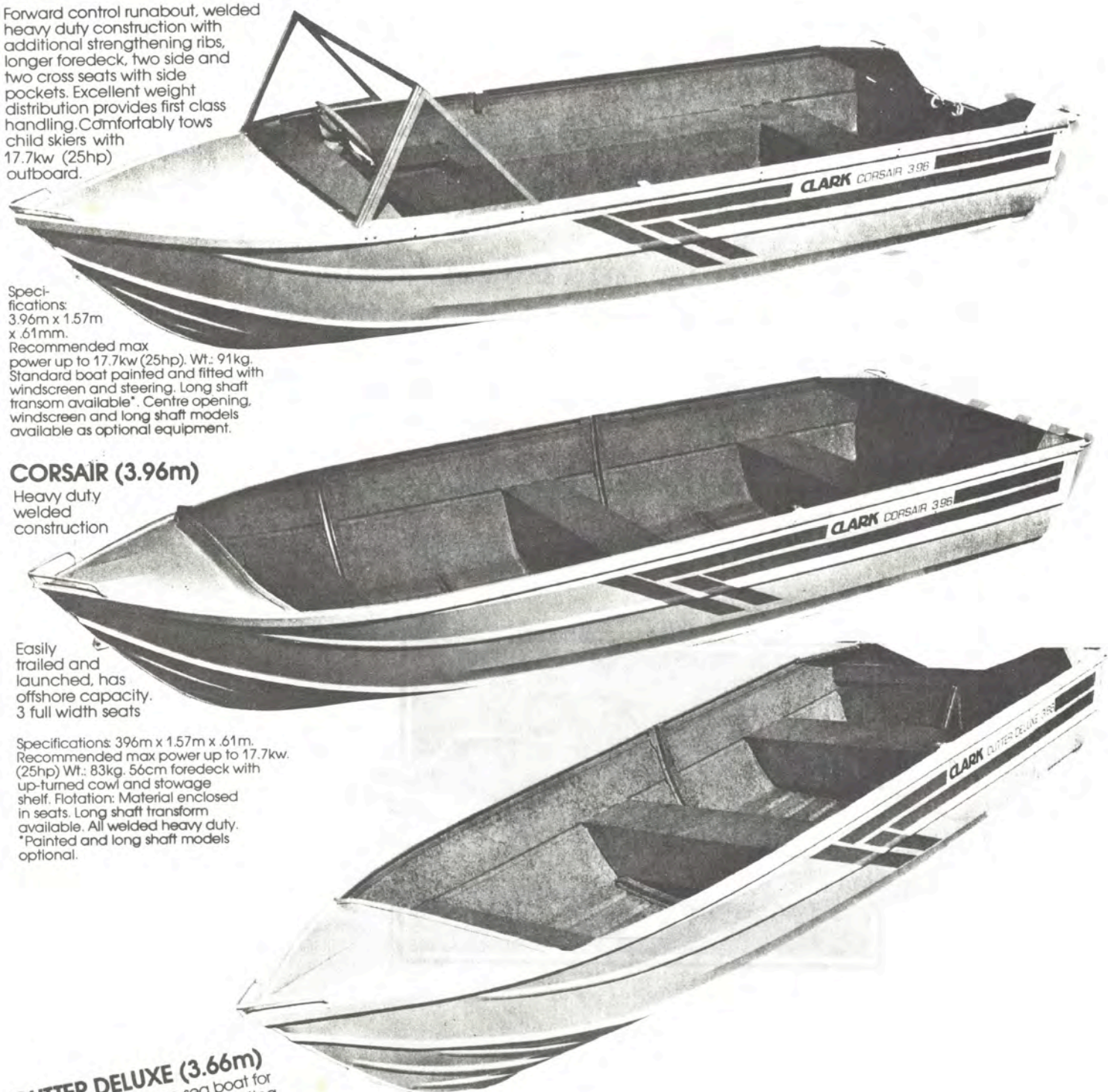
Easily trailed and launched, has offshore capacity. 3 full width seats

Specifications: 3.96m x 1.57m x .61m. Recommended max power up to 17.7kw (25hp). Wt.: 83kg. 56cm foredeck with up-turned cowl and stowage shelf. Flotation: Material enclosed in seats. Long shaft transom available. All welded heavy duty. *Painted and long shaft models optional.

CUTTER DELUXE (3.66m)

A heavy duty car-top sea boat for general fishing and family boating. 56cm deck with upturned cowl and stowage shelf for weather and spray protection.

Specifications 3.66m x 1.57m x .61m. Recommended max power up to 17.7kw (25hp). Wt.: 77kg. Flotation material enclosed in seats. All welded heavy duty. *Painted models optional.



Here's proof

Water Police, Maritime Services Board, State Emergency Services with observers from the Navy, State Contracts Board and Federal Purchasing Commission have all put Clark in front on load tests, stability and wave performance tests. Federal and State Government experts have tested Clark boats many times and as a result orders continue to be received from these departments, beating all competition.

"JOHN PUNT" (3.66m)

NEW STYLE All Welded

The ideal 3 seater for use in sheltered waters.

Specifications: 3.66m x 135cm x 41cm.
Recommended max power up to 5.3kw. (7½hp).
Wgt.: 43 kg. Flotation material enclosed in seats.



For river or lake, fishing or duck shooting, Clark has a range of light take-it-anywhere punts. Their shallow draught and high load capacity make them ideal for the sheltered water sportsman. Or just use it as a swimming platform.



"JOHN PUNT" (3.05m)

NEW STYLE All Welded

The light, take it anywhere boat with shallow draught and high load capacity. Ideal for fishing and duck shooting. Has 2 full width seats.

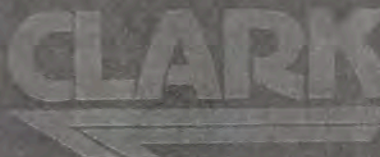
Specifications: 3.05m x 129cm x 41cm.
Recommended max power up to 4.2 kw (6hp).
Wgt.: 34.5 kg. Flotation material enclosed in seats.

WARRANTY

1. Clark Aluminium Boats ("the Manufacturer") warrants that it will, for a period of twelve (12) months from the date of purchase from a franchised dealer of the Manufacturer, repair any damage resulting from a defect in manufacture of the boat. 2. The manufacturer may at its absolute discretion determine whether or not any damage has been caused by a defect in manufacture and may repair the damage in such a manner as it thinks fit. 3. This warranty only applies to defects in manufacture appearing under proper use of the boat. 4. In the case of goods or components not manufactured by the Manufacturer, the Manufacturer shall only be responsible for such benefits as are given to it in respect thereof by the Manufacturers of those goods or components. 5. Where the purchaser is a consumer as defined by the Trade Practices Act 1974 certain statutory warranties are provided for the benefit of the consumer which warranties can not be excluded, restricted or modified and where the purchaser is a consumer this warranty shall be in addition to any statutory warranties arising under the Trade Practices Act 1974 provided that in the event of any inconsistency the latter shall prevail. In all other cases this warranty shall to the full extent permitted by law be in lieu of all other warranties, express or implied, written or oral, and of any nature whatsoever.



HIRE BOATS — Clark boats are ideally suited and extensively used as hire boats, conforming to marine authority specifications in all States. Hire boat enquiries should be made direct to Clark to ensure that individual state and local authority specification requirements are incorporated into each particular boat.



CLARK ALUMINIUM BOATS
A division of Alcan Australia Limited.
Incorporated in Victoria
359 Fison Avenue, Eagle Farm,
Qld. 4007. Phone: Brisbane
(07) 268 5151, 268 6195

SYDNEY OFFICE 20 Yalgar Road, Kirrawee, N.S.W. 2232.
Phone: (02) 521 8288

Buying a boat the Systematic Way: Draw a table (Thanks G. Mercer)

attributes	rating given to attributes	tender 1	score	tender 2	score	tender 3	score

- (1) List the attributes that you require:
for example: range, twin motors, aluminium, deck space, comfort, etc.
- (2) Assign a rating to each attribute (out of 10)
for example: range may be 7
twin motors may be 3
aluminium 2
deckspace for movement 10
comfort 5
- (3) Make a list of the types of boats available and collect the pamphlets.

For example the National Parks and Wildlife Service want to buy a boat:

For their range: They want something that will go a long way, so they give range a rating of 8

For the motors: They want the security of twin motors, but give it a rating of 3

For type of hull They want something durable for over reefs and want aluminium but will settle for a 7

For comfort They are not too fussy and go for a 1

For movement Space They are fussy and require a high attribute they want deck space 10

Now all these things are the attributes and are now have a rating. These ratings are put beside the attributes in the table and tenders are called: "Boat wanted for NPWLS, give quote etc!"

ATTRIBUTE	RATING	Tender 1	Score	Tender 2	Score
RANGE	8	Shark cat x 9	72	Aluminium x 9	72
MOTORS	3	Twin 35' x 10	30	Single x 5	15
HULL	7		↓ ADD		↓ ADD
COMFORT	1				
MOVEMENT	10	Excellent x 9		Poor x 4	
			TOTAL		TOTAL

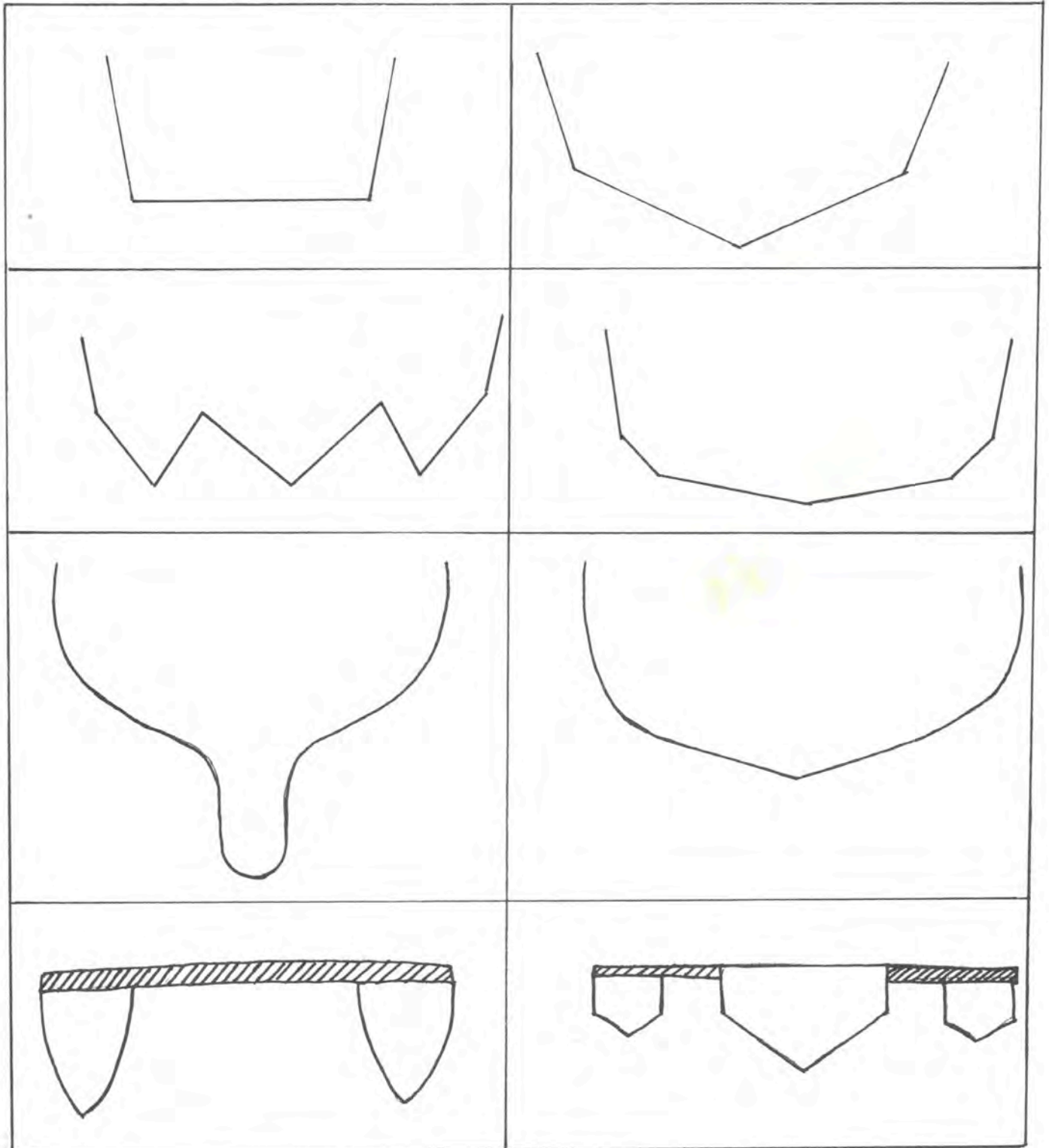
One of the tenders is a shark cat, 35ft, fibreglass
Another is a monohulled aluminium

The table is filled in and ratings given to the type of attribute the tendered boat has. Buy the boat with the highest score.

Scores are different because of ATTRIBUTE

Buy boat with highest score

Cut out or copy the diagrams below. Make rigging for the shapes or design a cabin. What motors or sails would you use?



diagrams courtesy Ithaca T.A.F.E.

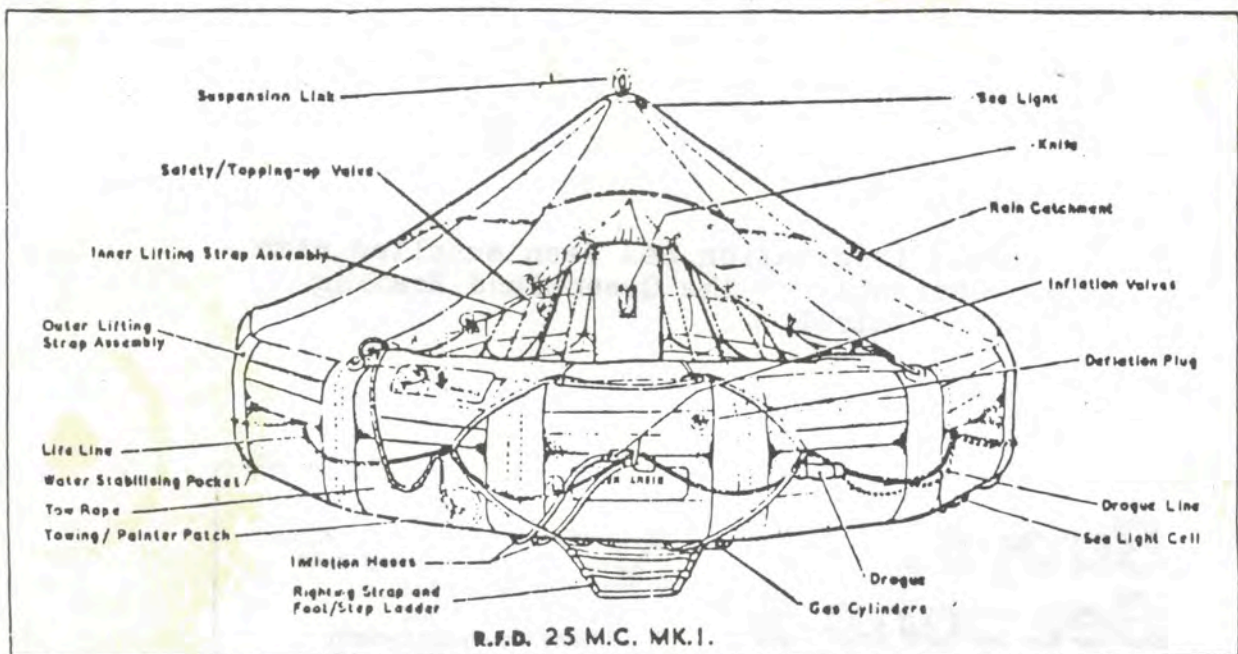
SECTION 2 SAFETY

<u>PRACTICAL ACTIVITIES</u> 1. Flares 2. Flammable liquids and gases 3. Acids 4. Expired Air Resuscitation 5. External Cardiac Compression	<u>STUDY ASSIGNMENTS</u> 1. Need for First Aid 2. Cost of a First Aid kit and items 3. Costs of Safety Equipment for small boats 4. Treatment for accident at sea
<u>CORE</u> 1. Safety Equipment 2. Boating Safety 3. Getting out of trouble	
<u>DIRECTED TOPICS</u> 1. Tide book 2. Safety Equipment 3. First Aid Kits 4. Safe Weather Forecast	<u>AUDIOVISUAL</u> 1. Dept. Harbour and Marine films 2. Boating Patrol films 3. S.E.S. films 4. Boating and Sports Clubs videotapes

Section 2: Safety

OBJECTIVES	RESOURCES
1. C. Describe the responsibilities of the owners of a pleasure yacht regarding safety.	Safety pamphlet
2. C. Define the terms: "smooth water" "open water"	Safety pamphlet Notes p 27
3. C. define the term "pleasure yacht"	Safety pamphlet
4. C. Describe how you would obtain further information about safety regulations.	Teacher demonstration Pool
5. C.P. Recognize different types of life jackets.	Teacher notes
6. S. Put on a life jacke in a pool	
7. P. Distinguish between jackets, buoys and rafts.	
8. P.A. Recognize the need for (7) above	
9. P. Use a table to detail the requirements for life jackets for any boat in Qld. waters.	Safety pamphlet Teacher notes
10. C. Recall the meaning of the letters A.S.A.	Safety pamphlet
11. C.P. Draw a V sheet and describe what it is used for.	Safety Flare Instructions
12. C.P.S. Describe how to ignite a smoke flare	
13 C.P. From a table of fire extinguishers indicate the correct use for common fires at sea.	
14. S. Use a fire extinguisher	Fire Dept. Demo.
15. P. Describe 2 types of Bailing equipment necessary for pleasure yachts.	Teacher Demo.
16. C. Define the terms: "lanyard", "bilge", "tender boat"	Notes
17. C. Describe how to obtain a chart	Notes
18. S. Use a phone book to buy a chart for the local area	Notes
19. P. Define the terms: chain pendant, anchor, rope, kedge anchor, plough anchor, bung.	Notes
20. S. Rig an anchor for a small boat	Notes
21. S. Anchor a small boat	Notes
22. C. Recall the amount of drinking water required to be carried	
23. C. Recall oars required	Notes
24. C. Retail the routine safety steps before setting out from home.	Notes
25. C. Recall the routine safety steps before leaving land	Notes
26. C. Recall the safety steps in the following cases of emergency:	Teacher notes
(a) boat stops (b) engine stops (c) man overboard (d) boat sinking (e) boat overturns.	

OBJECTIVES	RESOURCES
27.C.P.A. Listen to and intepret a safe. weather forecast.	Radio, T.V. forecasts
28. P. Be able to apply the knowledge gained in this section to new situations.	
29. C. Be able to spell and use correctly the following words:	
JACKET BUOY PLEASURE YACHT FLARE BILGE CHART	REGULATION EXTINGUISHER LANYARD FORECAST ANCHOR BUNG COMPASS



CORE

Collect the following pamphlets from the Boating and Fisheries Patrol, in your area.



Let us suppose that you have bought your boat and wish to equip it with safety gear.

What should be done first?

There are specific regulations which govern the safety equipment that must be carried.

The following information has been supplied with the kind permission of the Queensland Boating and Fisheries Patrol.

Buoys, Beacons & Marks

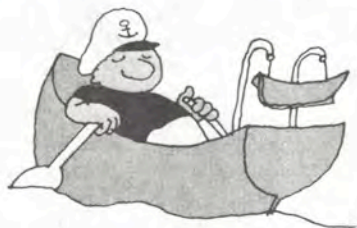
THE IALA MARITIME BUOYAGE SYSTEM "A"

Navigation aids, buoys, beacons and marks correspond to the Maritime version of Queensland's road signs. Queensland's Buoyage System conforms with the uniform coding system of IALA Maritime Buoyage System 'A'. This publication describes the type of marks and lights, as well as explaining their usage and application. All mariners are advised to have a full and complete knowledge of the operation of the IALA Maritime Buoyage System 'A'.

Safety Equipment (Pleasure Yachts)

The Safety Equipment (Pleasure Yacht) Brochure highlights what safety equipment is required to be carried by particular classes of vessels under the prescribed conditions. The minimum size of anchors to be carried and the location of smooth water limits are other aspects depicted in the brochure. An explanation of the 'V' and identification sheets also is included in this publication. Remember, carriage of the correct safety equipment can save your life or the lives of others!

Boating Safety



Safe boating can be described as a combination of knowledge, commonsense and courtesy. The "Boating Safety" Brochure provides hints on safer boating, as well as a pre-departure check list. The main "rules of the road" at sea are detailed, and the International Flags 'A' (diver's flag) and 'B' (dangerous cargo) are explained. For "accident free" pleasure on our waterways, "Boaties" are advised to have an intimate knowledge of the contents of this publication.

Notes on Small Craft

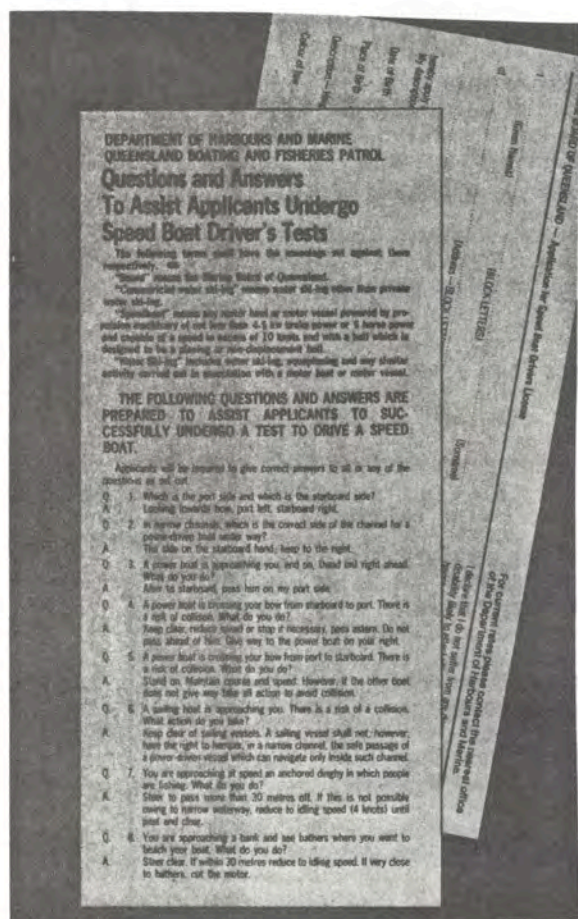
Before venturing on this State's waterways, "Boaties" should be aware that specific classes of vessels require registration, and that operators of certain vessels require licences. "Notes on Small Craft" provides information on the requirements and procedures for the licensing of speed boat drivers. The registration requirements of **private** vessels, and their correct identification, are explained. For **commercial** operators, interested parties should contact the Marine Board of Queensland, or the Senior Shipwright Surveyor.

Water Skiing



If water skiing is, or is about to be, one of your aquatic recreational pursuits, you are advised to study thoroughly the contents of the "Water Skiing Safety" Brochure. This publication provides information on licensing, ski areas, the responsibilities of passenger/observer and the limitations on skiing activities. Also, there are some useful skiing safety hints and illustrations of the recognised ski signals.

Before going boating, you should be aware that certain classes of vessels can be operated only by licensed operators. If your vessel is a "speed boat", you will be required to be the holder of a Speed Boat Driver's Licence. The above publication provides applicants with Questions and Answers to assist in successfully obtaining this licence and an application form. Remember, the Speed Boat Driver's Licence Test is both an oral and a practical examination.



Tide Tables

Besides containing the tidal predictions for the State's standard ports for the calendar year, this publication contains a wealth of essential information for the boater. Here is just some of the beneficial information:

- How to find the time and tide height of places other than standard ports;
- General notes on boating and angling, including Rescue Groups' Radio Frequencies, Distress Radio procedures and the location of public jetties and boat ramps.

The Tide Tables can be purchased from offices of the Department of Harbours and Marine.

Charts

The Department has available, for sale, a number of charts for specific areas listed below:

Steiglitz Jetty to Southport • Peel Island to Russell Island • Dunwich to Caloundra (Moreton Bay) • Pumicestone Passage • Brisbane River — Victoria Bridge to Pile light — New Farm to Mt Crosby Weir and Bremer River to Ipswich • Port of Weipa • The Narrows (Gladstone) • Gladstone Harbour.

Admiralty Charts are not available from the Department, but are on sale from approved agents throughout the State.

Small Ships Manual

This publication is an extremely beneficial source of boating information, not only for the professional but for the recreational-amateur mariner. All aspects of sound seamanship can be located in this manual. Besides providing information on areas such as the care and use of anchors, survival at sea and the International Regulations for the Prevention of Collision at Sea, it includes questions and answers for examination for Certificates of Competency.

The Small Ships Manual is on sale at all offices of the Department of Harbours and Marine.

Films

The Queensland Boating and Fisheries Patrol has a series of films available on various aspects of safer boating. These films can be screened by officers of the Patrol in conjunction with boating safety lectures. Clubs, organisations and interested groups are advised that these presentations are available, on request, from officers of the Queensland Boating and Fisheries Patrol.

The subjects covered by the films are as follows:

Fire hazards • Safety equipment • Rules of Road at Sea • Trailer/Sailing • Motor maintenance • Bar crossings • Stowage of gear • Join a Club • Water skiing • Inshore Waters • Alcohol • Seamanship • Search and Rescue • Means of being rescued • IALA Buoyage System 'A'

1. SAFETY EQUIPMENT

Activity 1 (objectives 1 - 16)

You will need:

- * Safety equipment (Pleasure Yacht pamphlet)
- * Standard Life jacket
- * V Sheet
- * Waterproof torch
- * Self igniting flares
- * Fire extinguisher
- * Bucket and Lanyard
- * Chart of Local Waters
- * Liquid Damped Compass
- * Drinking water containers (1l.)
- * Oars or paddles

All of these to be in accordance with a 4.88 boat for open water

What to do:

Complete objectives 1 - 16.

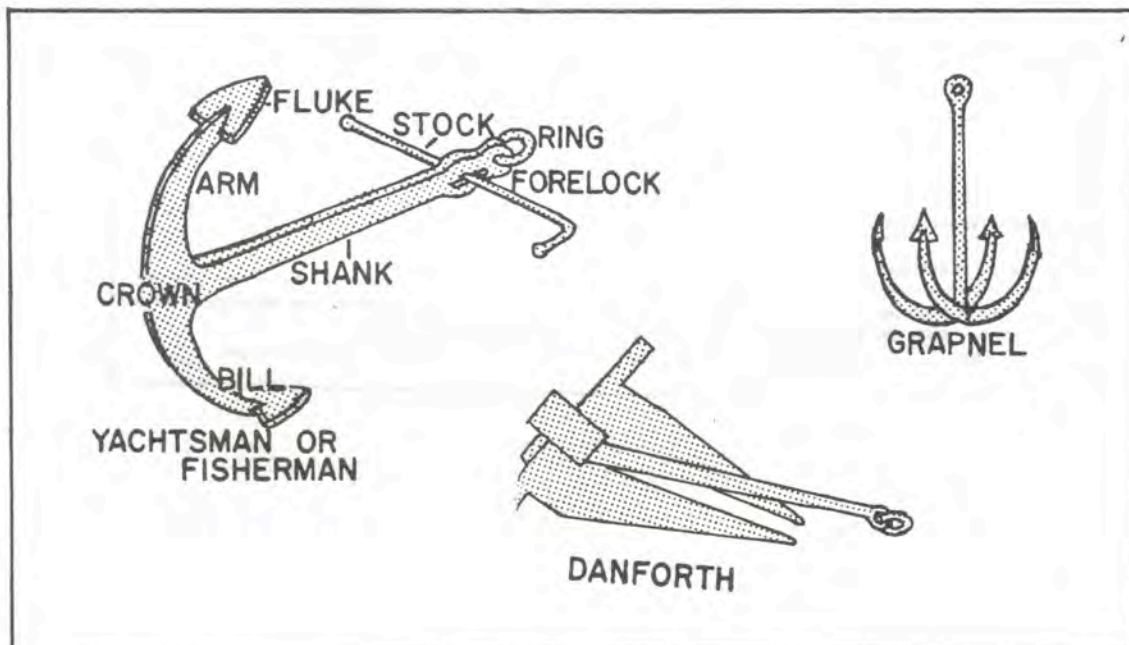
Notes:

Lanyard

A "rope" attached to a bucket or other loose equipment

Tender Boat

A small boat used to get to a larger boat anchored off shore.



Activity 2

SAFETY EQUIPMENT SCHEDULE

It is the responsibility of the owner and the master of every pleasure yacht to provide the safety equipment listed below in accordance with The Navigation (Equipment of Pleasure Yachts) Regulations of 1971, which apply to all pleasure craft, including sailing and rowing craft, except when engaged in properly organised and supervised competition events. Complete copies of these regulations are available at all Department Offices.

Note.—

"Pleasure Yacht" includes all vessels however propelled which are used for pleasure, including yachts, launches, motor boats, speed boats, sailing boats, dinghies, punts, houseboats, etc.

"Smooth Water" extends to 1 km offshore from Low Water Mark, and as shown for certain areas in the relevant regulations.

Areas outside these limits are considered to be open waters for the purpose of the regulations.

Schedule of Equipment (Abridged)	Under 4.88 m long		4.88 m to under 7.93 m		7.93 m to under 12.2 m		12.2 m and over	
	Smooth Water	Open Water	Smooth Water	Open Water	Smooth Water	Open Water	Smooth Water	Open Water
1. Life Jackets/Buoys/Rafts—								
Life jacket or buoyancy vest for each person on board (A.S.A. Standard 1512/1499)	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Life jacket for each person on board (1512)					Yes	Yes	Yes	Yes
One lifebuoy								
Boat/s or life raft/s to carry all persons aboard								Yes
2. Emergency Signalling Equipment—								
"V" Sheet		Yes		Yes		Yes		Yes
One waterproof torch or lamp	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
One signalling mirror	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
3 self igniting red hand flares		Yes		Yes		Yes		
6 self igniting red hand flares								Yes
6 parachute flares								
3. Fire Extinguishers—								
1 x 1 kg dry powder or equally suitable			Yes	Yes				
2 x 1 kg dry powder or equally suitable					Yes	Yes		
2 x 2 kg dry powder or equally suitable							Yes	Yes
4. Pumping/Bailing Equipment—								
One bilge pump, min. capacity 23 litres p.m.			Yes	Yes				
One bilge pump, min. capacity 45 litres p.m.					Yes	Yes		
Bilge pump or pumps, min. capacity 68 litres p.m.							Yes	Yes
Two buckets not less than 9 litres capacity with 2m lanyard	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
5. Navigation Equipment								
Chart of the waters in which the vessel is plying		Yes		Yes		Yes		Yes
Liquid damped compass		Yes		Yes		Yes		Yes
6. Anchoring Equipment (see table of sizes on opposite page)—								
Anchor with line min. 18.29m	Yes							
Anchor with line 27.4m		Yes	Yes	Yes				
Anchor with line min. 37 m					Yes	Yes	Yes	Yes
Two anchors with lines min. 37m					Yes	Yes		
Spare anchor with line								
When rope anchorline is used, a chain pendant not less than 2 m to be attached between rope and anchor (vessels 4.8 m and over)								
7. Drinking Water—								
1 litre water per person in container		Yes		Yes		Yes		
2 litres water per person in container							Yes	Yes
4 litres water per person in container								
8. Oars/Paddles—								
Pair of oars/paddles min. 1.2 m in length	Yes	Yes	Yes	Yes				

Tender Boat—4.88 m and under, used in immediate proximity to larger vessel shall be equipped with 2 buckets (9 litres), anchor with 18.29 m minimum of line and pair of oars/paddles.

As from January 1, 1983, all lifesaving appliances must be fitted with Retro-Reflective Tape.

"V" SHEET

- (i) A "V" sheet shall consist of a rectangular sheet of robust material not less than 1.8 metres by 1.2 metres in size. Such sheet shall have sewn hemmed edges with each corner reinforced by an extra layer of material and shall be of a fluorescent orange/red colour bearing the letter "V" in black. The letter "V" shall be not less than 750 mm in height with the strokes forming the "V" being not less than 125 mm in breadth.
- (ii) A "V" sheet shall have eyelets made of corrosion resistant material of sufficient strength at each corner fitted with suitable rope lanyards so as to make the sheet capable of being securely fastened down.
- (iii) A "V" sheet shall be capable of being securely fastened down so as to be visible from an aircraft.

SMOOTH WATER LIMITS**Port**

- Brisbane (1) Moreton Bay, south of the parallel of the northern extremity of Macleay Island.
(2) Pumicestone Strait, north of the parallel of South Point, Bribie Island, and west of the meridian of North Point, Bribie Island.
- Maryborough Sandy Straits, west of the meridian of the Inskip Point lighthouse and south of the parallel of the north head of the Mary River.
- Gladstone Gladstone Harbour and the Narrows, north of the parallel of South Trees Point.
- Rockhampton South and west of a line joining Cardigan and Cattle Points.
- Bowen West of the meridian of Dalrymple Point.
- Hinchinbrook South and west of a line joining Lucinda Point and the Bluff, and south of the parallel of Hecate Point.
- Mourilyan West of the meridian of Camp Point.
- Cairns South of a line from Bessie Point to Ellie Point.
- Port Douglas South of the parallel of the northern extremity of Island Point.
- Cooktown South of the parallel of the northern extremity of Grassy Hill Point.
- Thursday Island South of the parallel of and west of the meridian of Channel Rock and at the same time east of the meridian of Kate Point (Hammond Island), and at the same time north of the parallel of South Horn Point (Horn Island).
- Weipa South of a line joining Urquhart Point and Gombung Point.

ANCHORS AND CABLES

An anchor cable may be of chain or rope: Provided that where rope is used in a vessel 4.88 metres in length or over, a chain pendant not less than 2 metres in length shall be provided between the anchor and the rope.

The minimum sizes of anchors and cables shall be in accordance with the following table:-

Length of Vessel in Metres	Standard Kedge Anchor (kg)	Plough type and Stockless Anchors (kg)	Approved High Holding Power Anchor (kg)	Chain diameter (mm)	Rope (Breaking force) (kN)
Up to 3.65	2.3	2.3	1.4	6	7.56
Over 3.65 and up to 4.88	4.5	4.5	1.8	6	8.90
Over 4.88 and up to 6.71	9.1	6.8	3.9	6	11.12
Over 6.71 and up to 7.62	11.3	9.1	7.3	8	13.34
Over 7.62 and up to 9.15	15.9	12.2	12.2	8	17.79
Over 9.15 and up to 10.67	20.4	12.2	12.2	8	24.47
Over 10.67 and up to 12.2	20.4	15.9	12.2	8	26.69
Over 12.2					

In accordance with the weights and sizes specified in the rules and regulations for the construction and classification of wood and composite yachts issued by Lloyds Register of Shipping, London.

IDENTIFICATION SHEET

It is necessary for sea-going pleasure yachts of 10 metres or more in length, whether a power driven vessel or a sailing vessel, to carry an identification sheet.

- (i) **Power Driven Vessel:** The sheet shall be made of canvas or other robust material not less than 1.8 metres in length and 1.2 metres in breadth, yellow in colour; the vessel's registered numbers shall be painted or otherwise affixed (to the sheet) in black letters not less than 300mm in height with the stroke forming the letters or numbers not less than 60mm in breadth.
- (ii) **Sailing Vessel:** The sheet shall be of the same size and type for the power driven vessel, displaying the name and home port of the vessel in black letters of the size prescribed for the power driven vessel.
- (iii) When the abovementioned vessels are at sea and are approached by an aircraft, appeared to be carrying out surveillance duties the Master shall display the identification sheet in such a manner as to be easily distinguishable from the aircraft.

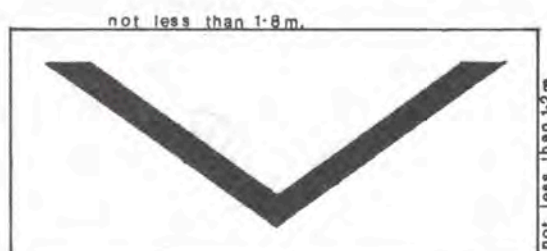
BN645Q**SEAWITCH
BRISBANE**

Power Driven Vessel

Sailing Vessel

STEER FOR SAFETY FIRST**USE OF THE SHEET**

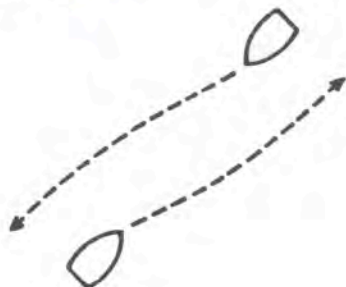
The sheet shall have lanyards attached to the four corners, and is to be exhibited in a manner so as to best attract the attention of searching aircraft, surface craft, or persons in the vicinity.



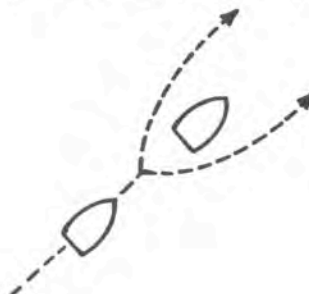
2. BOATING SAFETY

(1) The Rules of the Road at Sea

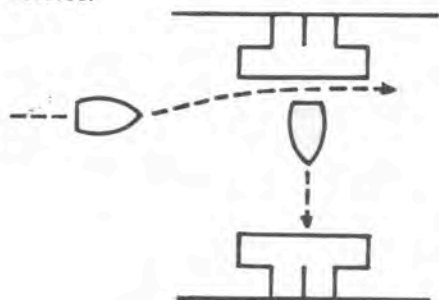
1. When two power boats are approaching head on, or nearly head on, each must alter course to starboard and pass on each other's port side.



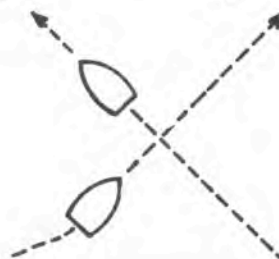
2. When overtaking another vessel the vessel being passed has right of way, and you must always keep clear of that vessel.



3. All vessels under 40 metres in length (except when they are towing or assisting another vessel) must give way to cross river ferries.



4. When a vessel is crossing your bow from starboard to port that vessel has right of way and you should keep clear. Stop or reduce speed and pass under his stern. (Give way to the vessel on your right.)

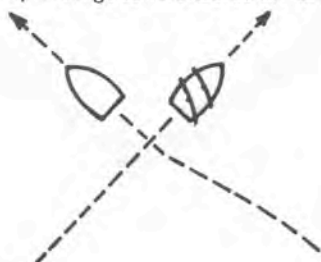


5. When a vessel is crossing your bow from port to starboard you should maintain course and speed as you have the right of way. If the other vessel does not give way, you should take all action to avoid a collision.

6. When in a narrow channel keep to starboard.



7. A power boat must give way to sailing boats, rowboats, ferries, and craft under tow. This rule does not give a sailing vessel the right to hamper the safe passage of a power driven craft in a channel where the power craft can only navigate inside such channel.



8. Do not moor or anchor in any recognized channel used by large or deep draughted vessels.

Large and deep draughted vessels have restricted manoeuvrability. Small craft must keep well clear of these vessels at all times and must not hamper the larger vessel's progress.



DEPARTMENT OF HARBOURS AND MARINE QUEENSLAND

SAFETY AFLOAT

Commonsense is the key note to boat Safety. For "Accident free" pleasure on our waterways use your boat and equipment properly within the design limits, exercise courtesy and follow the regulations.

Overpowering a speed boat can be dangerous. Do not exceed the weight and power for which your craft was designed.

There is a substitute for experience —

To obtain a knowledge of seamanship go boating first with an experienced friend, or join a boat club in which training opportunities may be available.

Until you can handle your boat with competence you should **not** venture beyond protected waterways.

Bars are dangerous. Experienced skippers treat them with respect.

Behaviour in the boat. Behaviour of the driver and passengers, particularly in a **light boat**, is very important. **Skylarking** is asking for trouble and inviting tragedy.

Passengers should be seated so that the boat is running on an even keel with the weight properly distributed. Standing or sitting on the bow or gunwale is dangerous.

Keep a good lookout at all times proceed with **caution** in unfamiliar waters.

EXCESS alcohol and boating don't mix.

The person in charge of a vessel is responsible for the safety of the craft and the lives of the passengers.

Lack of common sense and inexperience are the principle causes of loss of life at sea in small craft.

SAFETY CHECK

IF IN DOUBT DON'T GO OUT

Check the weather forecast.

Check your boat and motor(s). Make sure the boat is seaworthy and the motor is in sound working order.

Check your safety equipment. Carry the required amount of safety equipment and ensure it is in good condition and properly stowed.

Check your fuel. Make sure you have enough for the trip with an adequate reserve for emergency. Make sure your fuel lines are in good condition with no leaks.

Check your drain plugs and ensure they are tightly inserted.

Don't overload your boat. Distribute the load evenly and keep it low.

Carry a chart of the area and study it to familiarise yourself with the navigational aids and hazards.

Note the tides and currents.

Before departing advise a relative or responsible friend of —

- (a) Destination
- (b) Expected time of return
- (c) Your boat's description
- (d) People aboard

Consider other people. Prepare your boat **before** backing down the boat ramp.

The aforementioned information is published as a guide only, and is not intended as a substitute for the Queensland Marine Act 1958–75 or its regulations.

(2) Signals

The International Flag "B" exhibited by any vessel indicates that dangerous cargo is being carried. Keep well clear of these vessels at all times.



A rigid replica of the International flag 'A' not less than 1 m in height exhibited by any craft or on a float indicates a diver is down — KEEP CLEAR.



Unless an emergency exists, do not use or display any signal which may be mistaken for distress.

Regulations are made to protect your safety and pleasure.

Safety equipment and precautions

You should, on all trips, carry aboard:

1. A life jacket for each person on board.
This is most important. Non-swimmers and young children should always wear theirs while afloat. The most efficient type of life jacket keeps the wearer's face above water.
 - *2. Distress flares in a watertight box.
 - *3. Foghorn or siren.
 4. Baler or pump.
 5. Fire extinguishers.
 6. Sail or oars, if the size and design of boat permit.
 7. Sea anchor.
 8. First-aid kit.
- (These are all for use in various emergencies.)

- * 9. A compass.
- *10. Lights.
- *11. A torch. (Besides its obvious uses, should your lights fail at night, you can flash your torch to avoid being run down.)
12. Sharp knife.
13. Spare length of rope.
14. Anchor and chain.
- *15. Leadline, for use in unknown waters.
- *16. Boathook, for pushing off, fending off, picking up moorings and recovering man overboard, etc.
17. Spare petrol. A boat doing 5 m.p.h. travelling with a tide of 3 m.p.h. in one hour will cover eight miles and use one gallon of petrol. To return over those

(3) Getting out of Trouble (objective 26)

Set up a role play situation or a group discussion to resolve the following problem situations.

- (i) Boat stops suddenly with a jerk, but motor still going
- (ii) Motor stops
- (iii) Motor coughs and splutters with lots of smoke
- (iv) Boat starts to sink
- (v) Person falls overboard
- (vi) Person falls down and splits eye open
- (vii) Fishing hook caught in person's arm

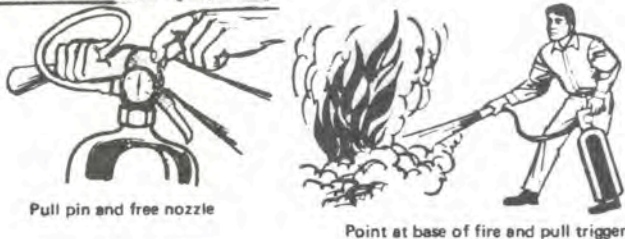
Practical Activities

1. Arrange to get some expired flares from a boat shop. Pull out the tape and simulate igniting it.

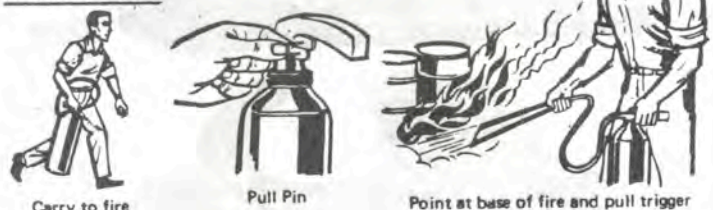
DO NOT IGNITE THE FLARE UNLESS YOU CHECK WITH THE POLICE, FIRE & EMERGENCY SERVICE
2. Arrange with the Fire Brigade for a simulated fire fighting display. They will come and let you use their extinguishers if you pay for the refills.
3. Practice using eye washes or water for acid burns to the eye, ear, hair, arms etc.
4. Practice Mouth to Mouth Resuscitation and Cardiac Massage.
5. Arrange for a talk from the local air sea rescue

Fire Fighting (approved types)

DRY CHEMICAL (cartridge operated)



CARBON DIOXIDE



DRY CHEMICAL (stored pressure)

and FREON



FOAM



How to use your portable fire extinguisher

Directed Topics

Your teacher may direct you to:

1. Use the Phys. Ed. Department's manikin for resuscitation.
2. Read the Tide Book.
3. Make Phone Calls to check further information on Boat Safety and/or equipment
4. Price a suitable first aid Kit for a boat.
5. Tape record a number of weather forecasts, play them back; discuss the advantage/disadvantage of going boating under the given conditions.

Audio Visual

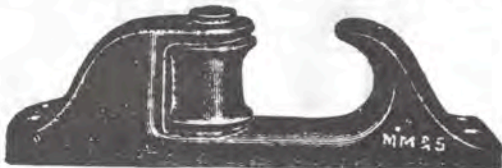
1. Contact Dept. Harbours & Marine for films.
2. Contact local S.E.S. or yacht club, water police, naval cadets, Sea Scouts, and other clubs for videos they may have on Boating Safety.
3. Make up a chart of Boating Safety.



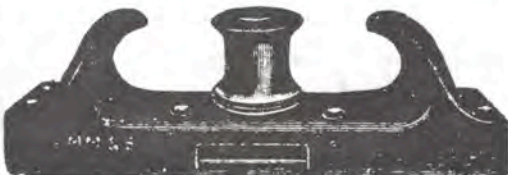
Cleat



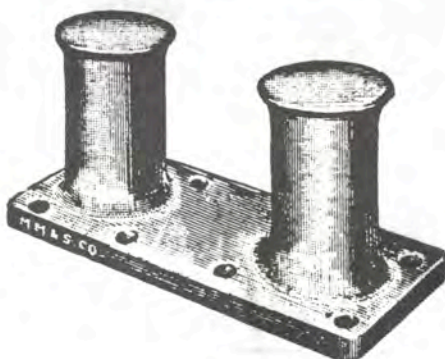
Open Chock



Single Roller Chock



Double Roller Chock

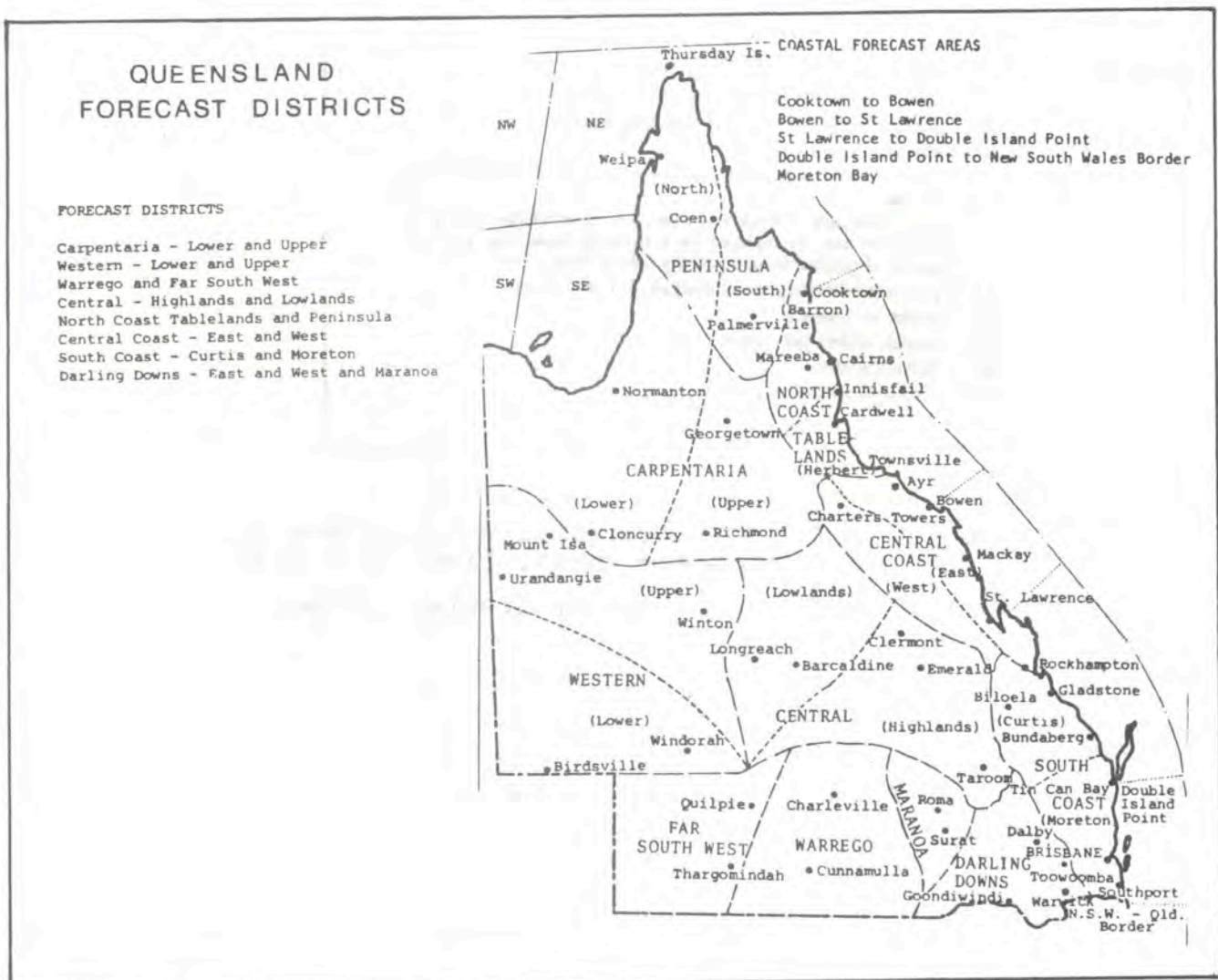


Bitts

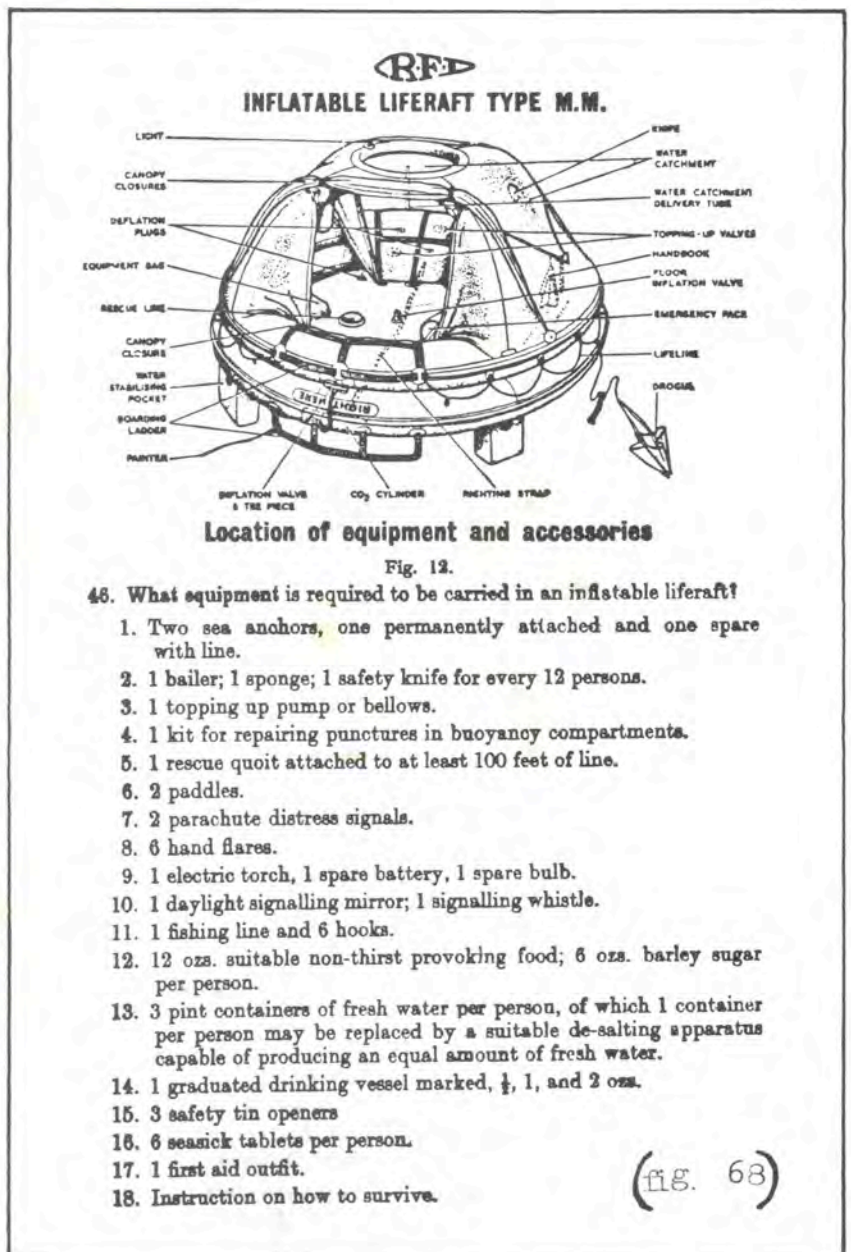
Deck Fittings used in Mooring.

Research Assignments

1. Study the Small Ships Manual, the section "Survival at Sea", pp 275 - 295.
Copy out 10 Questions and answers you found interesting, and discuss them in class.
2. Why should we never ignore a person signalling at sea?
3. Study the First Aid section of the above manual. Answer question 2 on page 368.
4. Copy out the 12 golden rules of First Aid on page 367 of the manual.
5. Discuss the various marine stings: jelly fish, stone fish, sting rays.
6. Obtain a copy of The Yachtsman's Handbook to the Whitsunday Passage, and study the section "Keeping out of Trouble".
7. Study the map showing the Qld. Forecast Districts.
 - (a) what area are you?
 - (b) listen to the forecast for all the coastal areas tonight and write down the one for your area.
 - (c) where would you go/ not go boating as a result of the above forecast.



8. Study the B.F.D. Inflatable Liferaft below.



- (a) Make up a Table of Equipment with columns for items and reasons for these. (from fig. 68)
- (b) Make a full size poster or display of the life raft.

SECTION 3: ELEMENTARY SEAMANSHIP

<u>PRACTICAL ACTIVITIES</u> 1. More knots 2. Model sail boat 3. Rope work 4. Tape recording weather forecasts	<u>STUDY ASSIGNMENTS</u> 1. Cost of fitting out boat 2. Types of materials in trailers 3. Timber hulls- where does it come from? 4. Tides in secondary places 5. Boat accessories
<u>CORE</u> 1. Parts of a boat, trailer, and motor 2. Parts of a sail boat 3. Tendering a boat 4. Reading the tide book 5. Interpreting a weather forecast 6. Power boat skills 7. Sailing skills	
<u>DIRECTED TOPICS</u> 1. Visit a boat retailer 2. Visit a boat builder 3. Rig a catamaran at school 4. Visit by boating Fisheries patrol officers.	<u>AUDIOVISUAL</u> 1. Power boat association of Qld 2. Nautical Norm Series - Qld Boating and Fisheries Patrol

Section 3: Elementary Seamanship

OBJECTIVES	RESOURCES
1. C.S. Identify the following parts of a boat: portside starboard side bow foredeck cleat deck keel ribs seat gunnel stern bung transom well cock	Notes p. 45 Model (709) Boat
2. C.S. Define with the aid of a diagram, the following parts of a trailer: handle bar frame rollers-rubber axle alloy brakes (if applicable) mudguard	Retailers pamphlets
3. C.S. Identify the following parts of a sailboat: stern mast stays boom tiller rudder goosneck battens jibsheet hallards	model sail boat
4. F. Realize there are no such things as "ropes" and that <u>hallards</u> are "ropes that pull sails up", and <u>sheets</u> are "ropes that control sails"	
5. C. Name the ring, stock, shank, arm, crown and fluke of an anchor	cut out anchor
6. P. Distinguish between a Reef and a Sand anchor	cut out anchor
7. P. Disntinguish between a Main sail, Genoa and Spinker	match box sails
8. S. Tender a boat using a rope; anchor a line	
9. S. Tie a clove hitch, slippery clove hitch	notes p.53
10. S. Plain whip a rope	
11. S. Tie a sheet bend	
12. P. Read a set of tide tables to determine tide at Primary port, Secondary port.	teacher demo. tide book
13. P. Identify a weather forecast suitable and unsuitable for boating in your local area	tape readio forecasts
14. C.P. Know the forecast district for your area and identify its boundaries on a map	Notes p. 56
15. C.P. Recall the limits of safety of a craft at sea	Notes p. 57
16.C.P.A.S. Recall and demonstrate correct methods for helping elderly or disabled people into/out of a boat	Notes

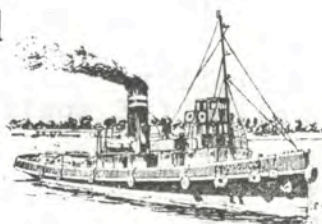
OBJECTIVES	RESOURCES
17. S. Row a boat	Teacher notes Boat, oars
18. S. Set a sail on a catamaran or similar vessel	Catamaran
19. S. Start an outboard motor	Motor
20. S. Swim 200m in less than 5 minutes	Pool
21. P. State the "rules of the road" to prevent a collision at sea.	Tide book
22. P.S. Recognize sand banks, dangerous water	Fisheries Patrol
23. S. Winch a boat onto a trailer	
24. P. Explain the lateral system of buoyancy.	
25. S.P. Use a compass to take a bearing	

QUEENSLAND MARITIME MUSEUM

DRY DOCK, STANLEY ST., SOUTH BRISBANE, 4101

**Steam Tug
FORCEFUL operated
by the Q.M.M.A.**

**SOUTH BRISBANE
DRY DOCK
1881**



**Relics of
Queensland
Maritime History**

**The Former H.M.A.S.
DIAMANTINA
displayed in Dry Dock**

HOURS: 10.00 a.m.—3.30 p.m. Wed.
10.00 a.m.—4.30 p.m. Sat. Sun.
and Public Holidays

PHONE: 44 5361 during opening hours
221 7395 business hours

CORE1. Knowledge of Boats, Trailers and AnchorsActivities

It is impossible to learn these from the notes. The notes serve as a homework revision to reinforce what was learnt during the day.... However, the names given are basic and must become part of your vocabulary. The more you use them, the easier you will come to be familiar with them.

Demonstration: Power Boat and Trailer

- Arrange for a small dinghy and trailer to be brought to the school.
- Choose a suitable area to park it, and then draw it.
- Use the names in the notes that follow, to identify the parts.
- One at a time, come forward and name the parts. You will notice that the first ones who will be slow, but as each student takes a turn familiarity will improve.

Here are your core names:

foreboat	transom
portside	keel
starboard side	ribs
bow	gunnel
stern	rowlocks
seats	bung

Here are your terms for a trailer:

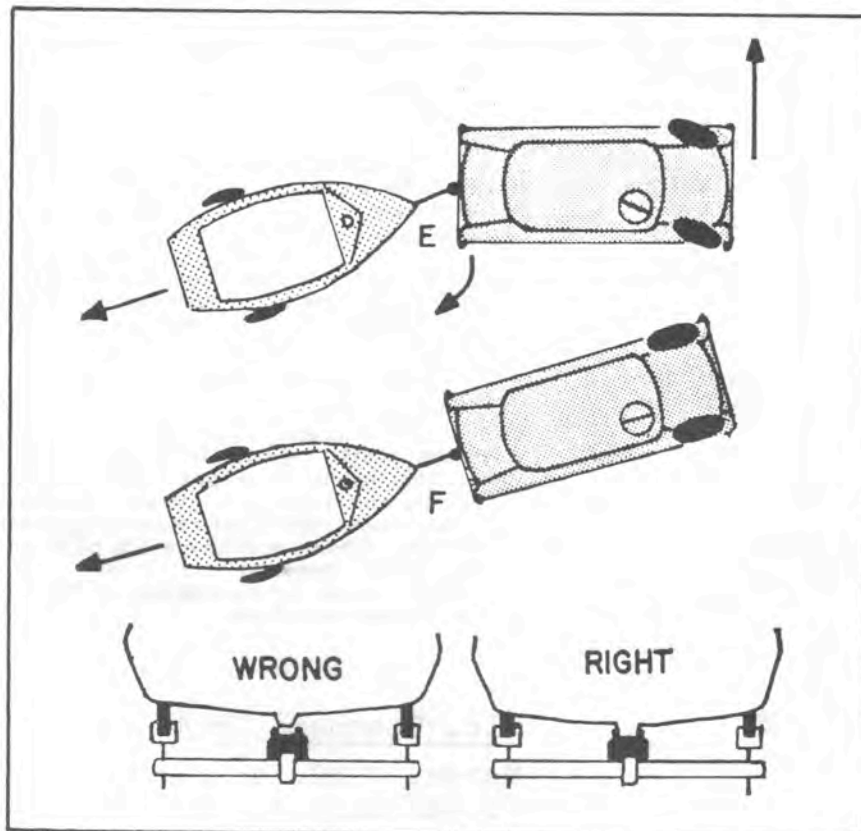
frame	light
axle	aluminium roller
wheel	rubber roller (if applicable)
mudguard	tow bar
stoplights	assembly
blinker	nut
spring	light socket connector
wheel nut	

Practical Activities (optional)

1. You will need - toy trailer, toy car
- ramp

Practice backing your toy car and trailer

2. Make up a table of the terms you have learned and include their meanings, as well as application of these terms.
3. Write a letter of thanks to the person who provided the trailer and boat.



In the above figure: if the trailer is to continue its direction, the car's steering has to (a) be corrected as in E; and then (b) centred as in F. The boat should be aimed, and the car manoeuvres to maintain the boat's direction. If oversteering in reverse causes the trailer and car to jack-knife, then you have to pull forward and start again. The bottom diagrams, that all mounting points must touch the boat equally; the boat's back can be buckled by bad mounting on the trailer.

Safety in programs using water-craft

Schools desiring to implement programs or activities involving water-craft should ensure that the following guidelines are observed:

Responsibilities of the principal

(a) The principal must obtain the approval of the relevant regional director of education for the program to operate in the school. Applications for approval should nominate the type of craft to be used; the area of use; the anticipated dates and times for use; and the number and names of students who it is anticipated will be involved.

(b) The principal must nominate the teacher-in-charge of the program. Prior approval must be obtained from the regional director of education if this teacher is to be replaced by another teacher.

Note:

The operator of the boat need not be a teacher, but should be a person selected for expertise and experience in this particular field and a person who is willing to work in conjunction with the teacher-in-charge. Knowledge of weather signs; knowledge of local tide and water conditions; ability to perform emergency repairs to equipment; and procedure involving first-aid treatment and resuscitation should be expected competencies to be held by the teacher-in-charge or the teacher's assistant.

(c) The principal must ensure that insurance provisions are adequate and that the teacher-in-charge and the boat operator are aware of their liabilities.

(d) The principal must ensure that for excursions involving monies and in which a number of students are riding in one vessel, the operator holds a launch master's licence and that the vessel has a current certificate of survey.

(e) The principal must obtain written approval from a parent or guardian for each child participating in water-craft activities.

(f) Approval for the overall water-craft program to be implemented in a school must be obtained from the parents and citizens association.

(g) The principal must ensure that all water-craft and trailer equipment are well maintained and that programs include instruction in the care and maintenance of such equipment.

(h) The principal must approve a code of general rules and safety rules, emergency procedures and behavioural expectations for students engaged in water-craft activities. This plan should be endorsed by the parents and citizens' association and should be submitted to the relevant regional director for approval.

Responsibilities of teacher in charge

(a) The teacher in charge should prepare a check-list of items to be observed prior to the activity. These should include:-

(i) a record of date; time of departure; area to be visited; expected time of arrival back at school; roll of students; and roll of adults to be handed to the principal prior to leaving school;

(ii) water-craft safety inspection;

(iii) safety equipment check;

(iv) fuel and water inspection;

(v) student life jacket and dress inspection;

(vi) student briefing on safety and emergency procedures; and

(vii) water-way hazard and obstacle check.

(b) Water-craft activities should be undertaken only when weather and water conditions are favourable. The rule "When in doubt — don't go out" should be strictly applied.

Solo-operated craft

(a) Every water-craft should be individually inspected prior to launching.

(b) The pick-up boat should be the first craft launched. All persons on board the pick-up boat must wear life jackets at all times.

(c) The teacher in charge must be competent to effect the rescue of a student in difficulty and must therefore be wearing appropriate clothing.

(d) Students should be trained not to stray from the group when on the water.

(e) Life jackets or buoyance vests must meet with Australian Standards Association requirements and must be worn at all times.

Water-craft equipment

(a) All water-craft and associated equipment for use with school children must meet the requirements of the Navigation (Equipment of Pleasure Yachts) Regulations of 1971 made in pursuance of the provisions of the Queensland Marine Act 1958-1967. Copies of the regulations are available from any office of the Department of Harbours and Marine.

(b) Water-craft should:

(i) be of the appropriate type for the waterways involved;

(ii) contain sufficient in-built buoyance, in the form of sealed air cases or other durable buoyant material, to support the total weight of the loaded vessel in the event of its filling with water;

(iii) carry loadings strictly in adherence with the manufacturer's specifications; and

(iv) be fitted with motors of appropriate power according to design specifications.

(c) Water-craft must be equipped according to the Navigations Regulations. These are summarised in the current Department of Harbours and Marine Boating and Fisheries Patrol pamphlet Safety equipment (Pleasure Yachts).

(d) The parents and citizens' association must signify willingness to accept responsibility for payment of all operating costs, registration of boats and trailers, insurances, maintenance and repairs of equipment associated with the program before the application for approval is submitted to the relevant regional director. Registration of boats and trailers is to be in the name of the Minister for Education.

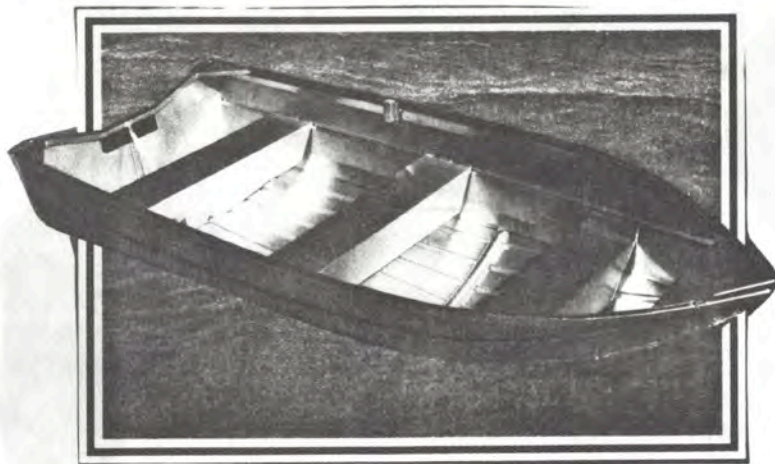
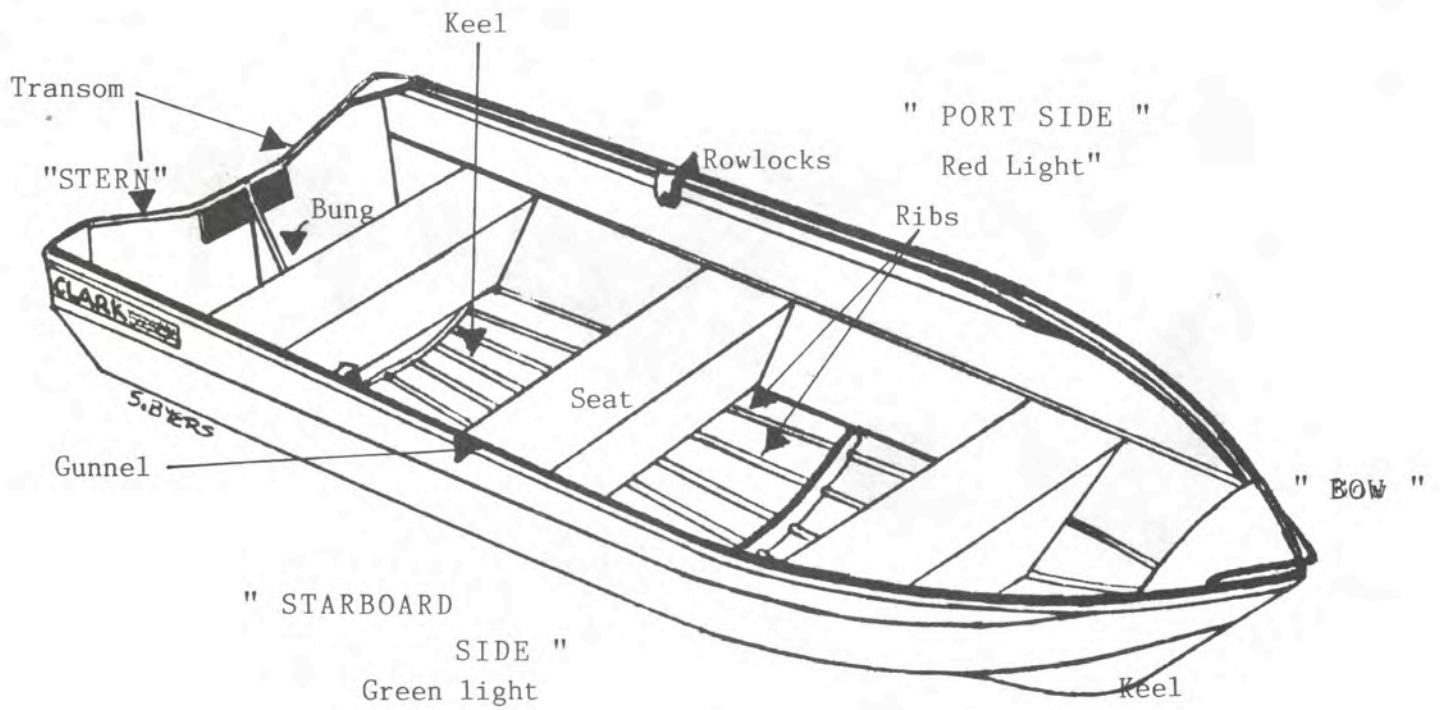
(e) Where possible, it is desirable to work in conjunction with local water-craft clubs.

Qld. Teachers Union Journal

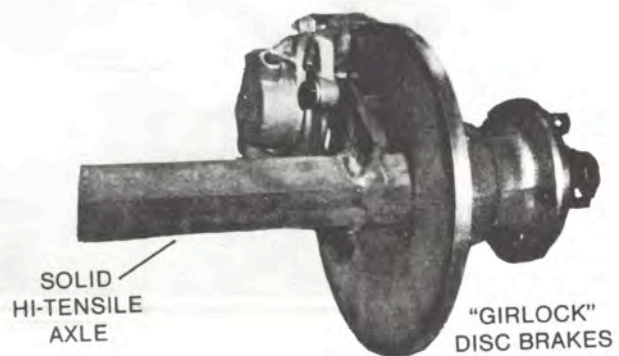
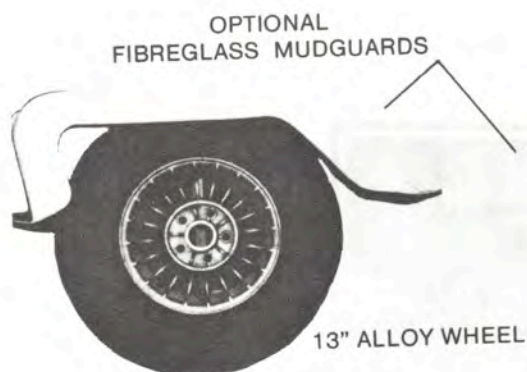
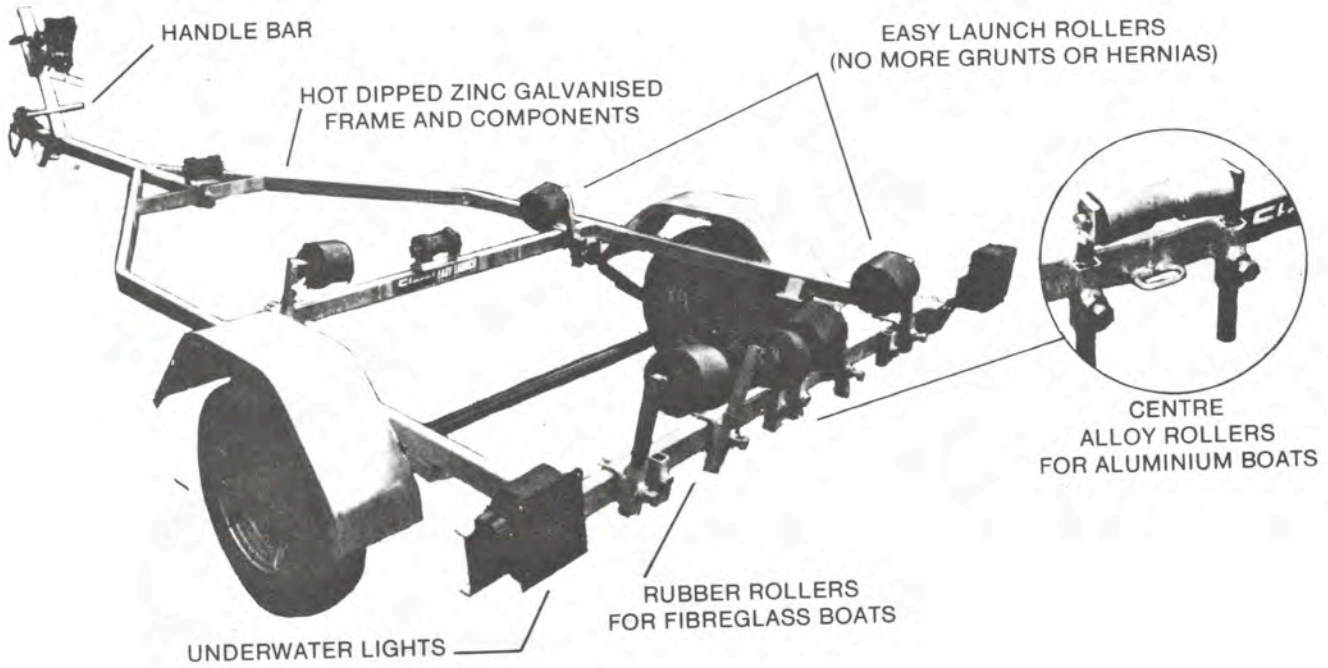
March, 1980. Volume 82, p.68.
(legal supplement)

CORE:

2. Parts of a boat



Some trailer components

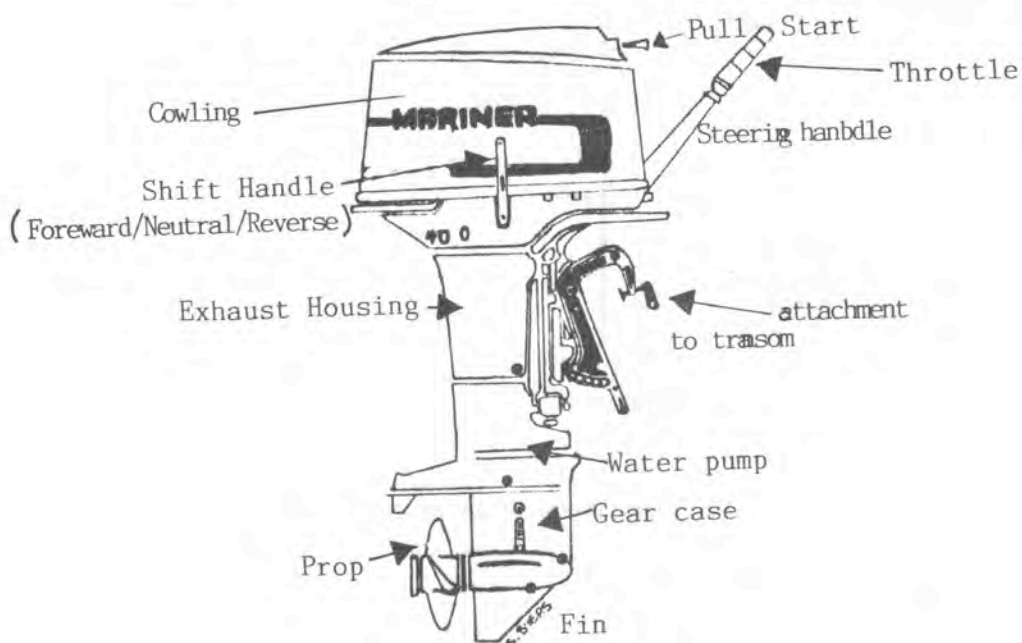


Demonstration

MOTOR AND FUEL TANK

1. Try to obtain some old motors that don't work. They will need thorough cleaning and perhaps a coat of paint before they are ready for use in the classroom.
2. (a) Draw the motor
(b) Label your drawing with the following terms and memorize them:

cowling (top cover)	exhaust housing
steering handle	shift handle
clamp	stern bracket
fuel tank	water pump area
gear case	propeller
fin	fuel cap
bulb	



3. You might like to draw up another table, as before, noting part names, their meanings, and their uses.
4. Don't forget to write a letter of thanks to those people from whom you borrowed gear.

DemonstrationANCHORS AND ANCHORING

1. See if you can obtain a range of anchors for this lesson
2. Make drawings of the various types of anchors and their parts.

CARE AND USE OF ANCHORS

The principal parts of an anchor are shank, crown, arms, flukes or palms, bills or peas, stock, ring or shackle, forelocks.

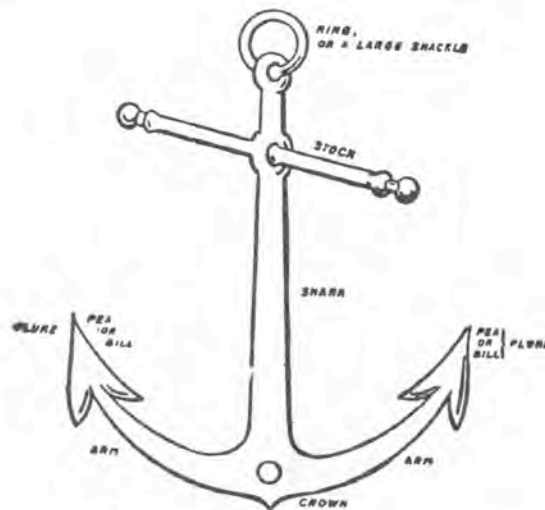


Fig. 47 - Principal Parts of an Anchor.

Types of Anchors

Anchors vary in design and performance as well as in size.

The holding power of a modern anchor is strictly dependent upon its design, and is proportional to the area of the flukes and the depth to which they are buried in the bottom. The weight of the anchor is only one factor.

All anchors, rigid or pivoted, rely on the principle of the ploughshare. A flat or curved piece of metal (the fluke) catches obliquely in the bottom. When anchors reach the bottom they may slip or slide for a period of time dependent on the type of anchor, its weight, its angle of incidence, its proportions, etc.

Information reproduced from the Small Ship's Manual
Department of Harbours and Marine, with kind
permission.

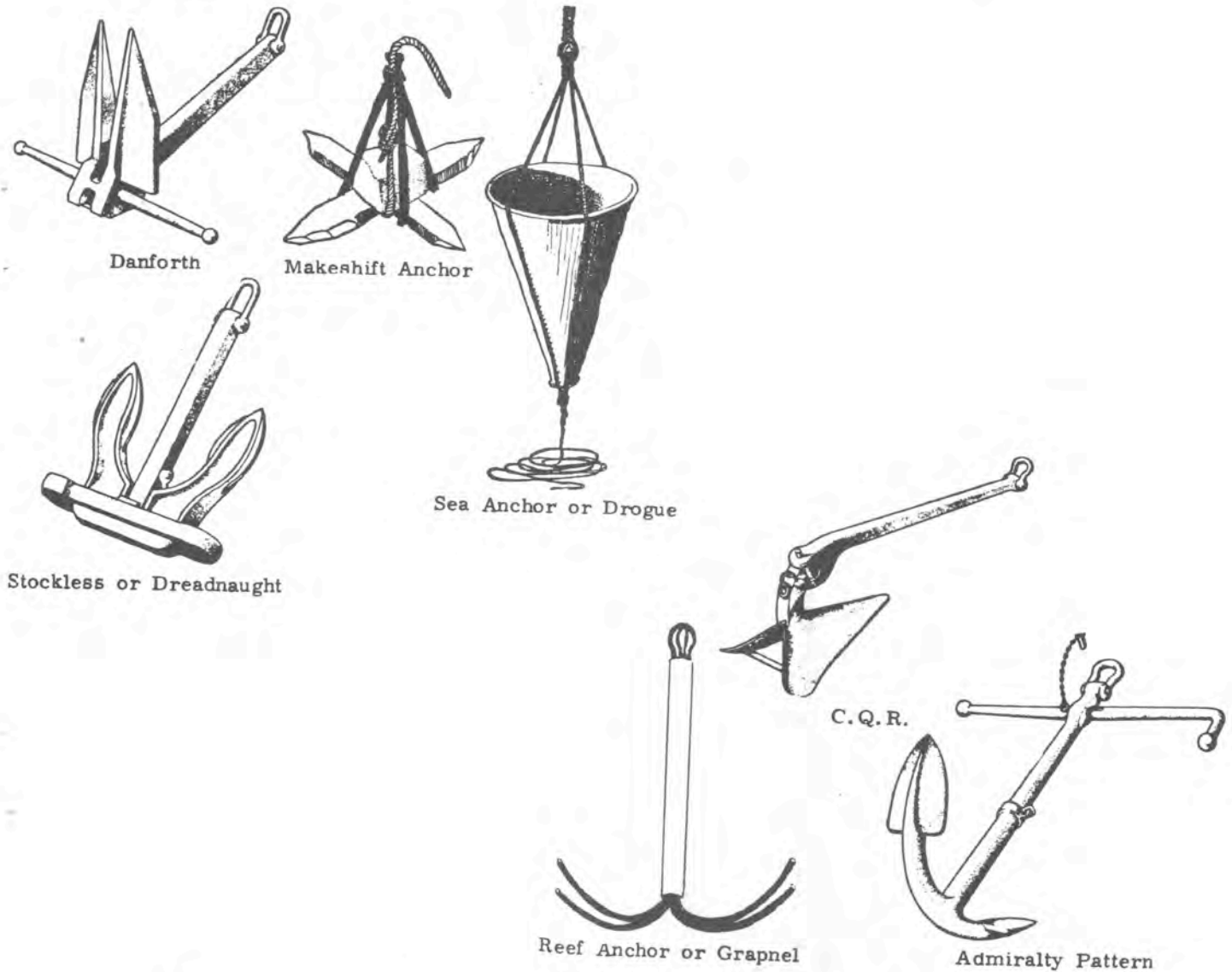
CARE AND USE OF ANCHORS

Fig. 49 - Types of Anchors.



FIG. 43: Anchor A

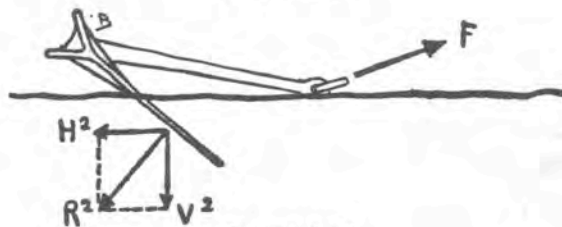


FIG. 44: Anchor B

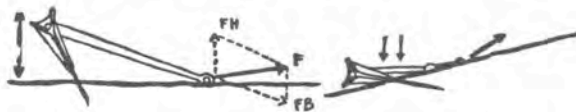


Fig. 48 - Retentive & Penetrative force as applied to anchors.

CARE AND USE OF ANCHORS

There are two principal forces which affect the anchor after it reaches the bottom, viz.

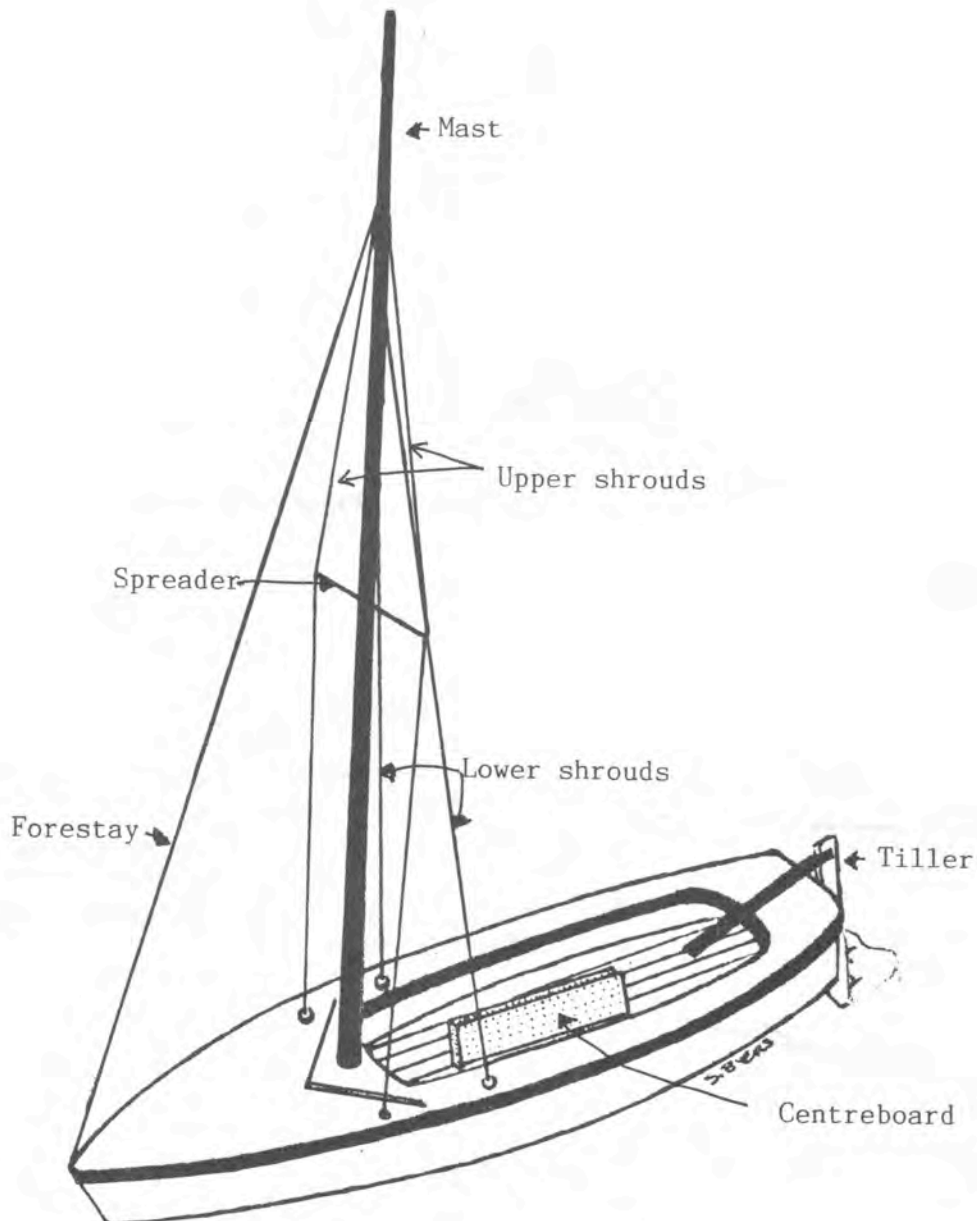
- (a) A horizontal pull against the drift of the vessel, which is called a retentive force.
- (b) A vertical, downward force, which is called a penetrative force.

Demonstration

Arrange to borrow a small catamaran or sabot, and rig it for this lesson. If you are not all that confident, arrange for the owner to come and explain the parts.

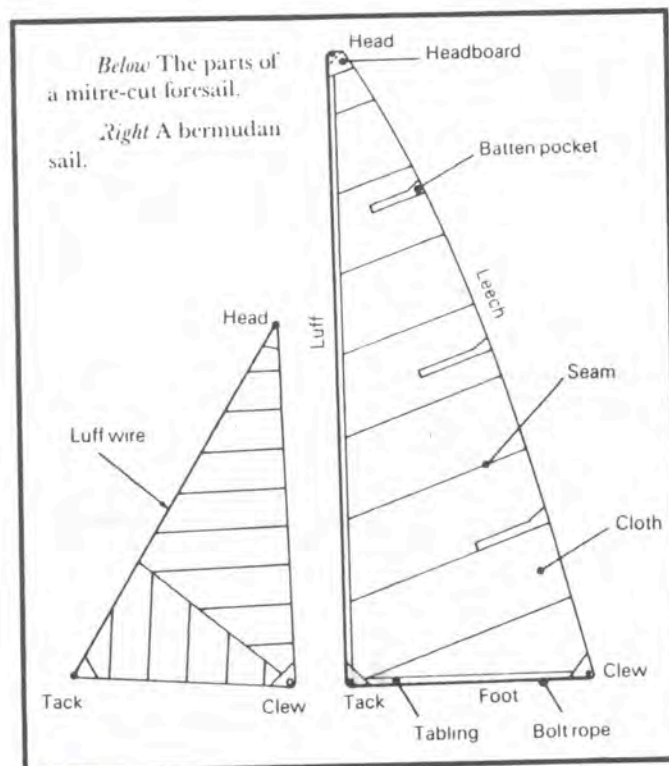
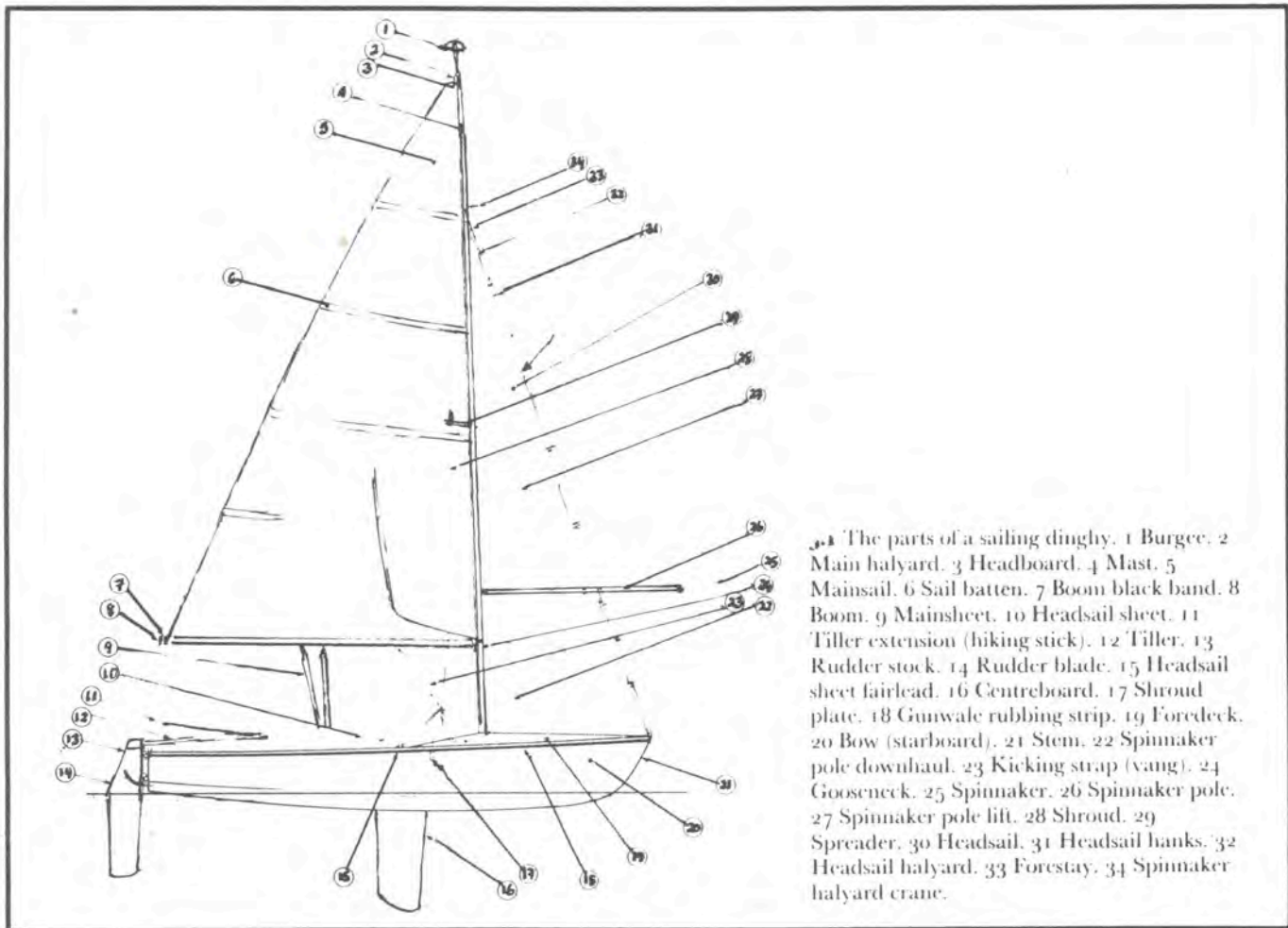
1. Draw the craft
2. Draw up a table of the following terms, with their meanings and uses:

tiller	mast	bow
rudder	shrouds	port
keel	spreader	starboard
centre board	forestay	



Demonstration

Learn the parts of the sails and the rigging.



3. Tendering Boats

Part of tendering a boat is to make sure it won't move away.

Copy the table below onto a blackboard or into your notes and complete it, discussing each step as you go.

Type of Boat	Where to Tender	Associated problems
A1 Punt A1 Dinghy Small runabout Caper Cat Catamaran 20' Sabot Ketch Ferry (small) Ocean Liner Oil Tanker		

You have most probably discovered you need to know some knots.

KNOTS

Demonstration 1: Basic Knots

There are 3 basic knots: (1) the figure of 8
(2) The clove hitch
(3) the Bowline

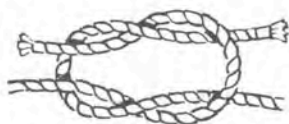
You will need some rope that won't tangle.... perhaps you can borrow some from the boy scouts or the sea scouts.

Knots and hitches

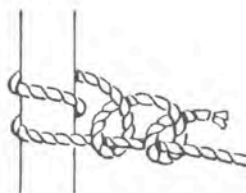
THE KNOTS shown here should cover the requirements of the average boat owner. An efficient knot must be easily and quickly tied, become more secure as the strain on it increases and be quickly and easily untied. The main length of a rope is called the standing part; a loop is called a bight; and the short end, the free end



Rope end.



Reef knot. Used where two ends of a single rope need joining. Do not use to connect two ropes.



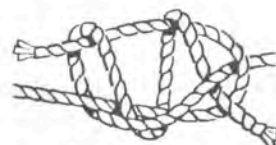
Round turn and two half hitches. For making fast boat's painter to a post or ring.



Bowline. Used for forming a loop in the end of a rope which will not slip but can easily be untied.



Sheet bend. For tying two ropes of the same size together or attaching a rope to a loop.



Double sheet bend. The best method of joining two ropes of unequal thickness. Can also be used for attaching rope to an eye splice or ring.

(Courtesy Harbours and Marine)

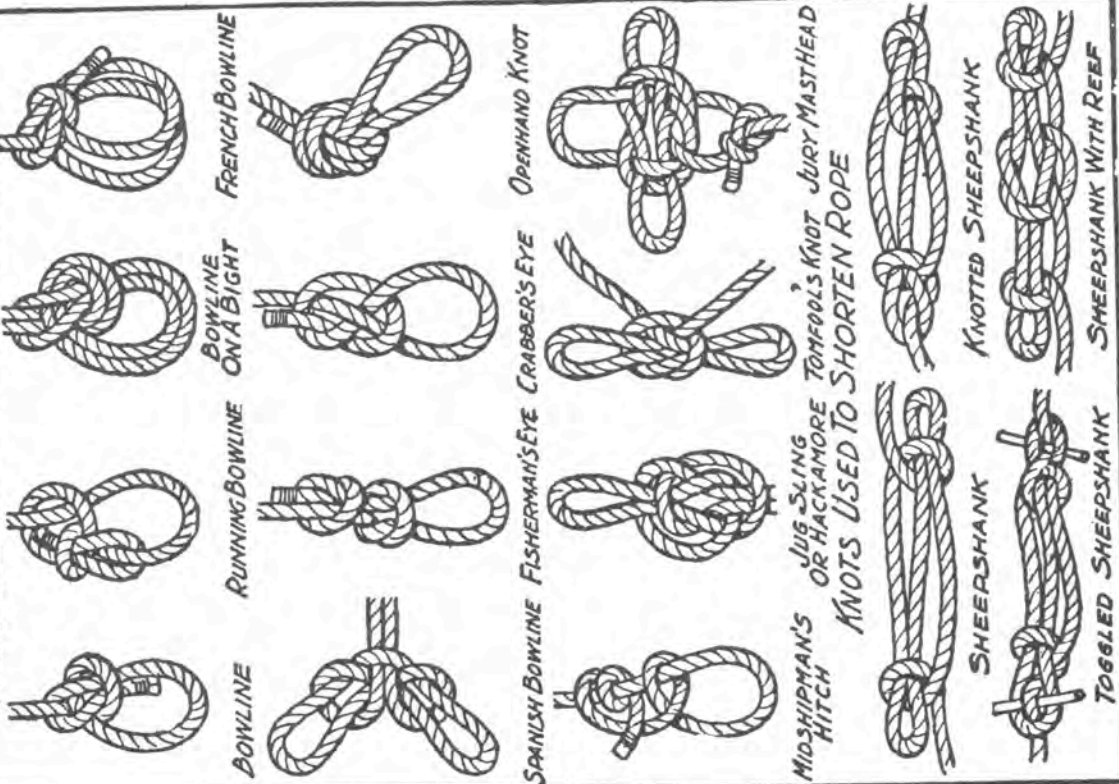
Learn to tie these first. Practice them at home.

Teachers Note: Demonstrate to the class a variety of boating situations where these knots could be used, Use a in class simulation to do this.

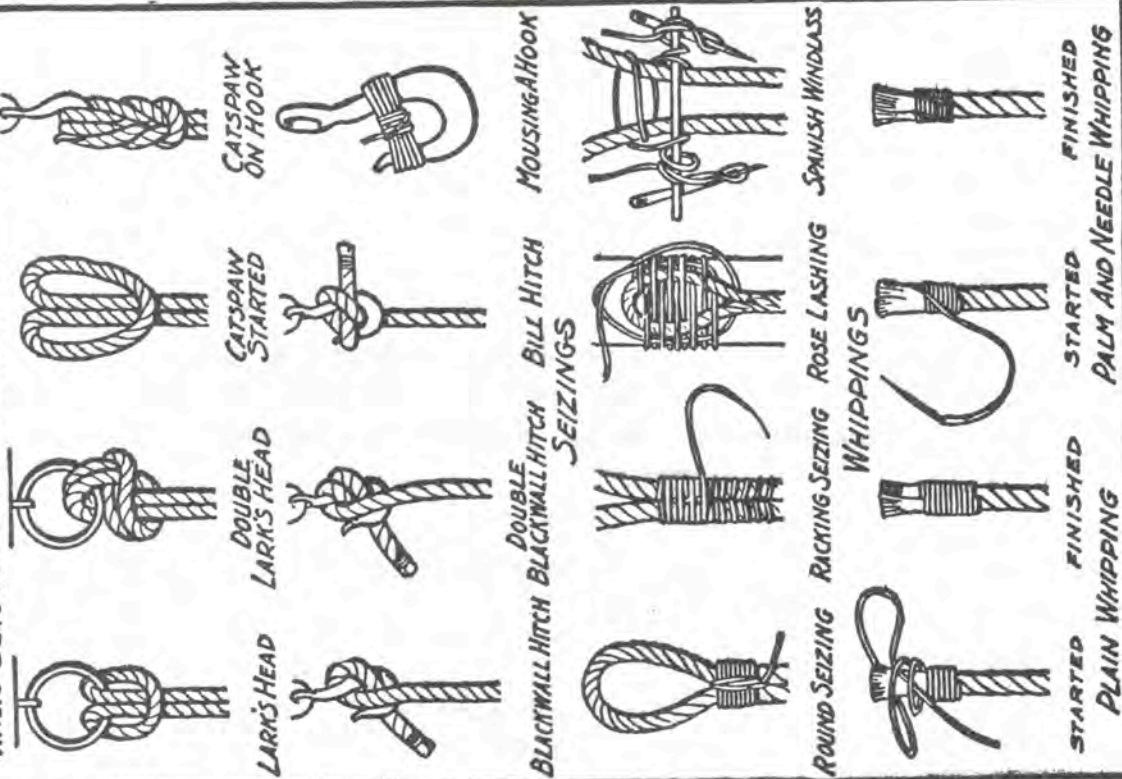
Activities:

1. Learn how to tie a sheepshank. What is the difference between this and a truckies' hitch?
2. Tie a Lark's head. When would you use this knot?
3. Tie a slippery Clove Hitch.
4. Tie a Round Turn and 2 Half Hitches.
5. Learn to splice a rope.
6. Learn to whip a rope.
7. Obtain some nylon rope and carefully heat the end in a candle. Does nylon rope have to be whipped?

KNOTS USED TO FORM ONE OR MORE LOOPS



KNOTS USED TO SECURE AN END TO A RING OR HOOK



4. Reading the Tide Book

Reading the Tide (Objective 12)

Obtain a copy of the Tide Book, produced by the Department of Harbours and Marine. Perhaps you can obtain a class set second hand, of the previous year's tide book.

Activity

- A. Find the table of contents and the section in the tidal predictions for your local area.
Answer the following questions:

- (1) What are the times for high tides today and low tides today, for the port nearest to you?
- (2) What do you notice about the heights of the high tides?
- (3) Does the highest one occur during the day or night?
- (4) If it is summer now, look up a month for winter and see when the highest tide is. What difference do you note? (if it is winter, then look up the summer high)
- (5) Plot the tides over a month and notice what happens to the high tide and neap tides.

- B. Now find the section dealing with Secondary Ports. Use this particular section if you are near a Secondary Port.

- (1) Calculate the time for high and low tides today at your port or beach.
- (2) What is the time difference? Express your answer as either "+" or "-".

Do question 3, only if you live near Bundaberg or Brisbane.

- (3) Find the time differences for Secondary Places table. Calculate the high tide say for Caloundra Headland or Russel Is. Your teacher will direct you here.

5. Weather and Boating (Courtesy Comm. Bureau Met)

MORE PEOPLE than ever before are taking to the water — in boats of all shapes and sizes: rowboats, canoes, sail and power boats.

There are more than 150,000 small power craft in Australia and, in addition, a growing number of sail boats. They operate on inland lakes and waterways, and in bays and harbors around the coast from Cairns to Ceduna, from Darwin to Esperance.

And they all have one thing in common: every time they put out from shore they are affected in one way or another by the weather.

Even with the most up to date equipment and a skilled and experienced skipper, it is the weather which determines whether the day's outing will be safe and pleasant or unpleasantly dangerous.

Yet the weather and its effects on a boat in the water are often poorly understood by the amateur boatsman.

The aim of this brochure is to inform him of the service offered by the Commonwealth Bureau of Meteorology in the interest of safer and happier boating.

THE ELEMENTS which affect a boat in the water more than anything else are wind, wave and sea swell.

These separately or together can blow a vessel off-course, swamp it, capsize it or at the best give the occupants some anxious moments.

WIND

An indication of the general wind pattern at surface level may be gained from the isobars — lines joining places of equal air pressure on the weather map. The closer the isobars are together, the stronger the wind over that area; the farther apart the lines are, the lighter the wind.

Wind flows in a clockwise direction around centres of low pressure (cyclones) and anti-clockwise around high pressure cells (anti-cyclones). However, wind is deflected slightly inwards towards "lows" and slightly outwards from "high" centres.

For more about this subject consult the Bureau's brochure "How to Read the Weather Map".

LAND AND SEA BREEZES — These occur in coastal areas. During cloudless nights the land cools rapidly while the water surface remains at almost the same temperature as during the day. Thus the land becomes colder than the water surface and the air over the land becomes colder than the air over the water. This tends to produce a flow of air from the land over the water. This is a *land breeze* which generally blows from late evening to just after sunrise and usually does not exceed 15 knots.

During the day, if the land heats rapidly, the water surface will be the colder of the two and the air over the water will be colder than the air over the land. This causes the wind to blow from the water to the land as a *sea breeze*, generally beginning in the morning and ceasing about sunset. The sea breeze may reach 15-20 knots and its arrival may be accompanied by squally conditions.

Land and sea breezes affect only a narrow area along the coast.

SQUALLS — A *wind squall* is a strong gust of wind, sometimes exceeding 80 knots, usually accompanied by a sharp change in direction which may or may not be accompanied by rain. A *thunder squall* is a strong gust of wind associated with thunder and may or may not be accompanied by rain. A thunder squall often accompanies a *frontal system*, or weather change.

Wind squalls, including thunder squalls, are violent and hazardous, particularly for a small boat in open water.

DIURNAL EFFECTS — The surface wind may be strong and gusty during the day, especially during clear summer weather, yet it becomes almost calm at night. This variation is not the result of a change of pressure pattern but because during the day surface heating and eddying causes the surface winds to approach those aloft, while during the night surface cooling reduces the eddying motion of the air in the lower levels and the surface wind tends to be very much less than winds aloft. A light wind in the early morning can often give a false sense of security, as frequently wind increases during the day.

STATE OF THE SEA

It is important that the person in charge of a boat should know how his craft will behave in various types of sea.

Forecasts and weather maps issued by the Bureau of Meteorology make reference to the *state of the sea*—that is, the height of the waves measured from their peaks to their troughs.

With sea swell the waves are of long wave length (crest to crest) and depend on the strength of the wind blowing in a distant area and how long it has blown.

Local conditions also affect the state of the sea. Shallow water increases the steepness of the sea and sea swell.

In the table below giving state of the sea the wave heights given apply only to the open sea. It is not possible to apply them to inshore waters where wave heights are affected by the sloping sea-bed as well as by off-shore and on-shore winds.

WIND STRENGTH

Reference to wind strengths in weather maps, for shipping and aviation, and even for on-land purposes is usually made in knots. However, a code, known as the *Beaufort Scale*, developed in 1805 by Admiral Beaufort of the Royal Navy to estimate wind speeds from their effects on the sails of naval vessels, is also widely used.

Guide for relation between wind strength and wave heights for wind-generated waves:

Beaufort Force	WIND		WAVE HEIGHT (Feet)	OPEN SEA INTERNAT. CODE
	M.P.H.	Knots		
1	1-3	1-3	0	CALM (GLASSY)
2	4-7	4-6	0-1	CALM (RIPPLED)
3	8-12	7-10	1-2	SMOOTH (WAVELETS)
4	13-18	11-16	2-4	SLIGHT
5	19-24	17-21	4-5 / 6-8	MODERATE
6	25-31	22-27	8-13	ROUGH
7	32-38	28-33	13-20	VERY ROUGH
8	39-46	34-40	20-30	HIGH
9	47-54	41-47	30-45	VERY HIGH

FORECASTS AND WARNINGS

Because of the dependence of small boats on the weather, the Bureau of Meteorology issues special forecasts for pleasure boating. The forecasts provide details of expected wind and state of sea, and the Bureau implements these with special warnings of strong winds as necessary.

The Bureau issues warnings of likely strong winds whenever average winds exceeding 25 knots (Force 6 range on the Beaufort Scale or 29 m.p.h.) are expected. These warnings contain details of the expected direction and speed of the wind and an indication of future developments.

When the average wind force is expected to exceed 34 knots (Force 8 or 39 m.p.h.), or to reach or exceed 48 knots (Force 10 or 56 m.p.h.), gale or storm warnings are issued.

Forecasts and warnings are prepared in the Regional Office of the Bureau in each capital city from information collected at the Bureau's 60 field offices and by some 700 part-time observers throughout Australia and adjacent territories. These observations include measurements of wind, temperature, air pressure and humidity at the earth's surface and similar measurements in the upper air to heights up to and sometimes exceeding 100,000 feet.

On receipt of these reports the information is plotted and analysed, synoptic charts drawn up showing the current weather picture, and forecasts compiled of expected conditions. Forecasts are issued to the press, radio and television for publication and broadcasting and are also available over the telephone dialling service.

Forecasts tend to get "stale" and out of date and for this reason the Regional Offices revise their forecasts throughout the day and pass this latest information to radio and television stations for speedy dissemination to the public.

As most people these days have transistor radios, there is no reason for boatmen or their passengers not to hear radio broadcasts of the news and weather. The set should be kept tuned to the one station; this minimises the risk of missing an important weather announcement through "dial twiddling".

Most commercial and national radio stations broadcast weather forecasts during or near news sessions during the morning, afternoon and night. Some stations broadcast weather information every half-hour.

The weather

BEAUFORT WIND SCALE

THIS is a table founded on that originally compiled in 1805 by Admiral Beaufort. Summarised, it is as follows:—

Figure to denote force of wind	Description	Velocity in Knots
0	Calm (Calm sea)	0
1	Light air (calm sea)	1—3
2	Light breeze (smooth sea)	4—6
3	Gentle breeze (smooth sea)	7—10
4	Moderate breeze (slight sea)	11—15
5	Fresh breeze (moderate sea)	16—20
6	Strong breeze (rough sea)	21—26
7	Near gale (very rough sea)	27—32
8	Gale (high sea)	33—40
9	Strong gale (very high sea)	41—47
10	Storm (very high sea)	48—55
11	Violent storm (phenomenal sea)	56—63
12	Hurricane (phenomenal sea)	Over 63

Fine weather

Anti-cyclones. Wind round a central area of high pressure blowing spirally outward and in a clockwise direction. These travel slowly.

Clouds. High and softly rounded cumulus (massy cloud forms with flat base and rounded outlines).

“Mare’s tails” or curries: white filmy clouds with feathery ends.

Early low and hazy (stratus) in a cloud form of horizontal extension and low altitude forming into cumulus as sun rises.

Sky. Red at night. A low dawn. Light bright blue by day. Early morning mist.

Heavy dew falls.

Wind

Wind dying at sundown: wind before rain—wind decreases.

Fine weather

Fish. Near surface and phosphorescent in water at night.

Birds. Flying well out at sea.

Moderate Weather Signs

Clouds. Cirro-cumulus or “mackerel sky”.

Changes

Clouds. High clouds travelling against wind or in opposite direction to low ones—expect change in wind direction.

“Wind-galls” (detached clouds with haloes)—expect increasing wind and possibly rain.

Note: Head for the nearest shelter if you observe the wind rising to a force at which spray is whipped off the top of waves. This is a danger signal for vessels at sea.

BEFORE YOU SET OUT

- Listen to the weather forecast on the radio.
- Get a chart of the area you will be navigating. Study it.
- Study the tides. This can be vital, as you will see.

WEATHER SIGNS

The motor yachtsman has available to him weather advice by means of wireless weather reports, reports from Meteorological Office and also his own forecasting.

To assist in the latter, here are some weather signs which should prove useful:

Barometer: *Rising*—Expect N. wind, or less wet weather, or less wind.

Falling—Expect S. wind, or wet weather, or more wind. “Quick rise after low, foretells stronger blow.” “Long foretold, long last. Short foretold, soon past.”

Atmosphere: Uncommon clearness—coming wet and possibly wind.

Moon: With halo—wind and wet.

Stars: Twinkling—wind and wet.

Bad weather

Cyclones. Wind round a central area of low pressure (or “depression”) blowing inwards and around in an anti-clockwise direction. Travel moderately fast, usually in E. direction. Of varying density.

Clouds. Dark and solid looking cumulus. High stratus heaped in centre and thin towards edges. If it collects quickly (cirro-stratus) storm is near. A mixture of bad weather cumulus and cirro-stratus means stormy winds. Nimbus (uniform greyness often over the whole sky) means rain. Cumulo-nimbus (a mountainous cloudy mass) means thunder. Light flying clouds (scud) across heavy clouds mean rain and wind. Scud alone means wind only.

Sky. Red in morning. A high red dawn means wind. Steely-blue dawn, with a brassy rind round the sky means hard winds.

A dark sullen blue sky by day also means wind.

If bright yellow at sunset—wind. If dull yellow at sunset—wet.

Rainbow in morning means wet and possibly wind

Rainbow in evening means wind.

Wind

Wind continuing through night: rain before wind—wind increases.

Bad weather

Birds: flying inshore indicate strong winds at sea.

READING THE SIGNS

Before taking to the water the amateur fisherman, yachtsman or power boat enthusiast should have seen the weather map as published in the press or shown on television. In this way he can follow the weather pattern and learn to make an assessment of likely conditions within the ensuing 12 to 24 hours.

He should obtain the latest official forecast as broadcast over the radio or television or contained in the automatic telephone dialling service.

He should continually up-date the official forecast by his own observation of the weather. If he feels a change in the wind or sees clouds building up on the horizon — both of which often presage a change in the weather — he should be ready to make for the shore as quickly as possible.

Understanding the phraseology used in weather forecasts and warnings is also most important.

To make a weather forecast quite clear to everyone reading it or hearing it, the forecast would have to be given at extreme length. Since this is not practical for the various media of mass communication, the Bureau of Meteorology uses a set phraseology based on internationally accepted standards. It is important, therefore, that the boatman should understand the terms used in the forecast if he is to avoid misunderstanding or confusion and if he is to derive the utmost benefit from the information.

It is also important to remember that the forecasts are issued for specified areas and have to be limited to general statements of the weather situation and should be modified by personal observations of local conditions.

Additional information about the Bureau's services and schedules of broadcasts of news sessions over national and commercial radio and television stations may be obtained from the Regional Office of the Bureau of Meteorology as listed below.

Other Bureau publications which will be of value to the boatman are:

"The Weather Map and How to Read It";

"The Aneroid Barometer and How to Use It".

These may be obtained from the Regional Office in each capital city.

Regional Office for Victoria, Commonwealth Centre, La Trobe Street, Melbourne. 32 0411	Regional Office for New South Wales, 18th Floor, Commonwealth Centre, Elizabeth Street, Sydney. 259 3404.
Regional Office for Queensland, Wickham Terrace, Brisbane. 2 0521.	Regional Office for South Australia, 5 West Terrace, Adelaide. 51 1128.
Regional Office for Western Australia, Wellington Street, Perth. 21 6193	Regional Office for Tasmania, Ellerslie Road, Hobart. 2 2834.
Regional Office for the Northern Territory, Administrative Building, Mitchell Street, Darwin. 2893.	Regional Office for A.C.T., 3rd Floor, MLC Building, London Circuit. 49 6270.

**REMEMBER — SAFE BOATING IS
HAPPY BOATING
BE WEATHERWISE — ALWAYS**

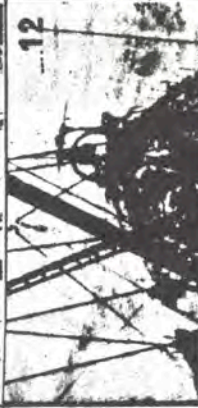
PH. 17

Revised 1967

PRINTED BY DEPARTMENT OF SUPPLY,
CENTRAL DRAWING OFFICE, MARIBYRNONG, W.3



COMMONWEALTH BUREAU OF METEOROLOGY

BEAUFORT WIND SCALE		Mean wave height in metres	
	0 BEAUFORT NUMBER....	CALM 0-1 KTS Sea like a mirror.	
	1	LIGHT AIR 1-3 KTS. 01 WAVES Ripples with appearance of scales; no foam crests.	
	2	LIGHT BREEZE 4-6 KTS. 02 WAVES Small wavelets; crests of glassy appearance, not breaking.	
	3	GENTLE BREEZE 7-10 KTS. 03 WAVES Large wavelets; crests begin to break; scattered whitecaps.	
	4	MODERATE BREEZE 11-16 KTS. 10 WAVES Small waves, becoming longer; numerous whitecaps.	
	5	FRESH BREEZE 17-21 KTS. 20 WAVES Moderate waves, taking longer form; many whitecaps; some spray.	
	6		STRONG BREEZE 22-27 KTS 30 WAVES Larger waves forming; whitecaps everywhere; more spray.
	7		NEAR GALE 28-33 KTS 40 WAVES Sea heaps up; white foam from breaking waves begins to be blown in streaks.
	8		GALE 34-40 KTS 55 WAVES Moderately high waves of greater length; edges of crests begin to break into spindrift; foam is blown into well-marked streaks.
	9		STRONG GALE 41-47 KTS 70 WAVES High waves; sea begins to roll; dense streaks of foam; spray may reduce visibility.
	10		STORM 48-55 KTS 90 WAVES Very high waves with overhanging crests; sea takes white appearance as foam is blown in very dense streaks; rolling is heavy and visibility reduced.
	11		VIOLENT STORM 53-63 KTS 145 WAVES Exceptionally high waves; sea covered with white foam patches; visibility still more reduced.*
	12		HURRICANE 64-71 KTS 140 WAVES Air filled with foam; sea completely white with driving spray; visibility greatly reduced.

6. Power Boat Skills / Sailing Skills

These can only be done if the school owns a craft or you can borrow a craft.

If you borrow, you run all the risks associated with borrowing. If you are going to buy a boat for the school, go through Section 1 again.

For the Power Boat

A. GETTING STARTED:

The teacher will show you how to:

- (1) Mix 2 stroke fuel, 50 parts standard/super petrol to 1 part oil. Make sure you use a good quality outboard fuel.
- (2) Fill the petrol tank making sure the air intake on the cap is adjusted correctly.
- (3) Connect up the petrol line to the motor. Check for dirt, sand. Check "o" rings and seals.
- (4) Prime the motor using the bulb.
- (5) Choke the engine (if cold)
- (6) Adjust the throttle to start.
- (7) Pull the cord, and warm up the motor.
- (8) Change gears.

B. READING THE SERVICE BOOKLET:

Obtain a copy of the Service booklet and go through it with your teacher.

Learn how to flush the motor and remove the cowling.

C. TAKING THE BOAT OUT:

WARNING: It is illegal to drive a boat over 6 h.p. without a licence.

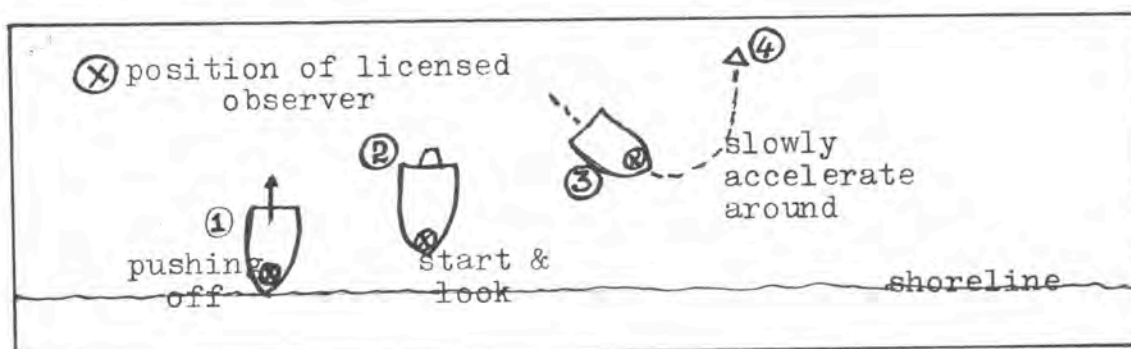
Make sure you have a licensed operator on board

SAFETY

- * It is well worth your while investing in a propeller guard, especially when you are using the school boat as a training vessel.
- * Make sure all the necessary safety gear is on board (see Section 2).
- * Remember you are now directly responsible for the safety of all on board. Read carefully the E.O.G. regulations on Boating and Boat Safety.
- * Learn some emergency signals so that you can communicate with your teacher or instructor.
- * Make sure you have a licensed observer sitting near the bow.

Going Out

- (1) Push the boat off from shore with stern out.
- (2) Lower the motor and start the engine, and look around for any obstacles.
- (3) Change into gear - forward
- (4) Ease down on the throttle turning the boat around now to face away from shore.

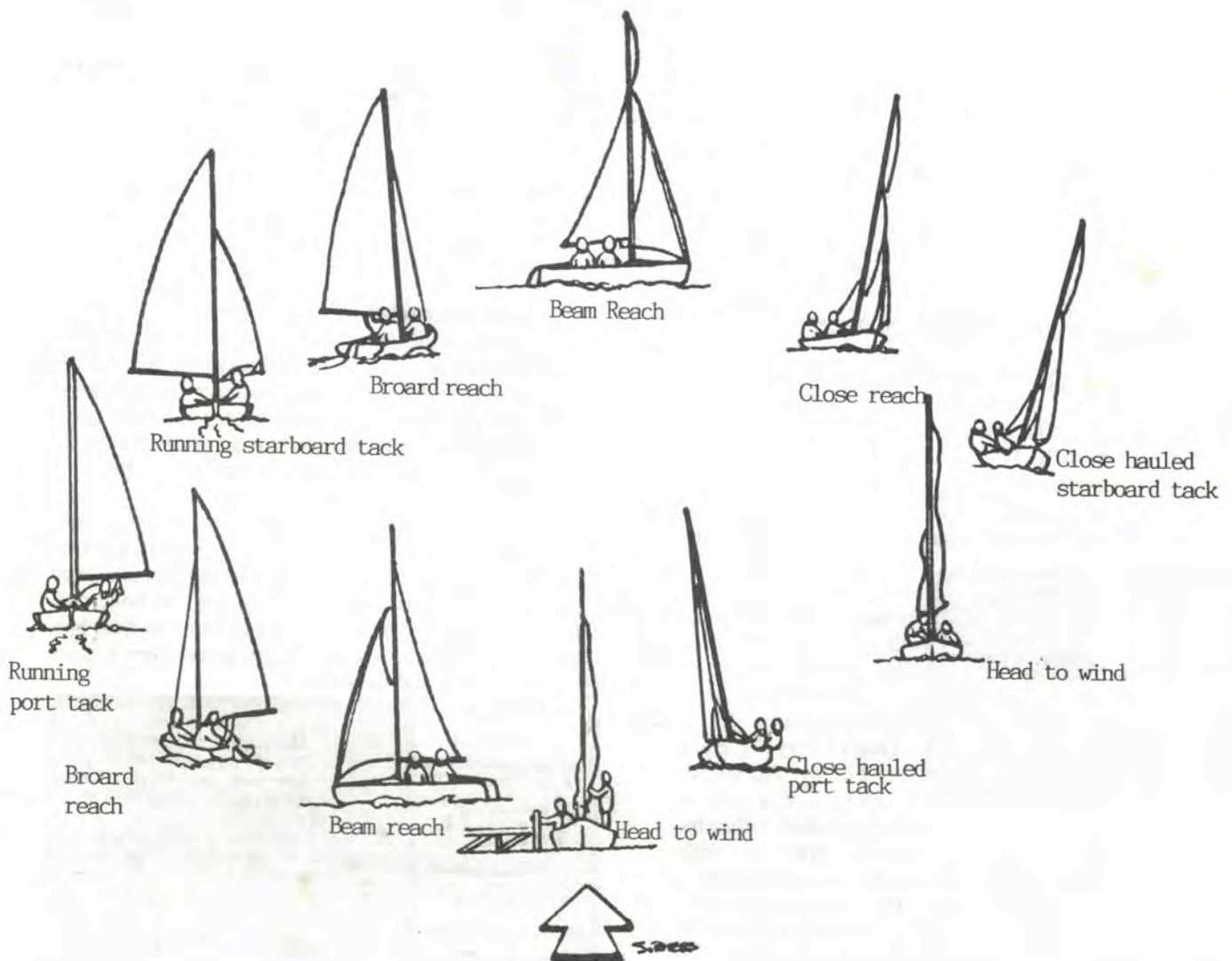


- (5) Take her steady getting the feel of the motor.
- (6) Check to see that the water pump is working - you can see a fine stream of water coming out of a small jet under the cowling.



Coming Back - beach landing

- (1) Sight where you want to make landfall.
- (2) Remember that your boat does not have brakes. (It does, however, have reverse but it is unwise to use it coming into shore)
- (3) Remember that the propellor will hit the bottom if you don't pull the motor up.
- (4) Come in very slowly. About 10m from shore switch off the motor. The boat will tend to move towards land. Have your observer ready to stop the boat.
- (5) Now quickly pull the motor up - you will hear a click.
- (6) When the observer advises, jump into the water.



Steering—the action of the rudder

THE DIRECTION in which the boat travels is dependent on the angle of the rudder, and the rudder is operated by moving the tiller. In a dinghy or sailing boat the tiller may be operated by hand from the stern of the boat; but in a motor boat the vessel is generally 'steered by the helm', that is, a steering wheel operates the tiller.

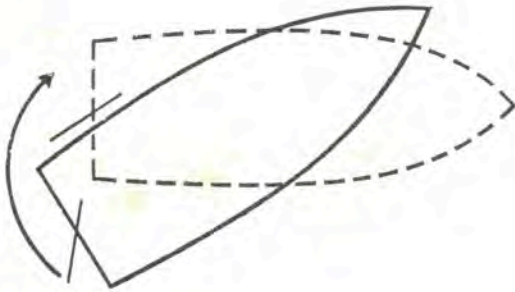


Fig. 12 Action of rudder.

10

Coming Alongside

IT IS both easier to manoeuvre and much safer if you bring your motor boat in to a jetty *against the tide*. (Coming in with the tide makes it more difficult to judge the point at which to switch off the engine, as you are being swept along by the current.)

Aim to run in parallel to the line where you intend to stop, and switch off your engine just before the point where you mean to moor. Approach at low speed, and your impetus will carry you onwards after you have switched off. Remember to have your fenders out.

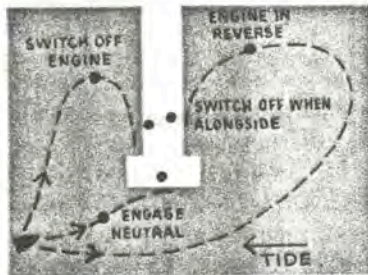


Fig. 14 Coming alongside.

Don't worry if you are not exactly alongside. A gap of a few feet is easily rectified, either by natural drift or with the help of anyone ashore to whom you can throw a rope. Naturally, you will throw the bow rope as it is undignified to be towed in stern first! Once the bow rope is made fast, the rudder and tide can be used, if necessary, to bring the boat alongside. If it is absolutely necessary to come alongside *with* the tide, use reverse gear to check your speed. Just switching off your engine will not serve

IN REDRAFT THIS IS TO
BE RE TYPED AND ALTERED



Fig. 13 Direction boat moves ahead.

Steering a boat is exactly the same as controlling the steering wheel of a car. Wheel to starboard will turn the nose of the craft to starboard, but what is actually happening is this: turning the wheel to starboard moves the tiller to port and the rudder blade in the water swings to starboard, so the boat alters direction to starboard (Fig. 12). Similarly, helm to port moves the tiller to starboard, the rudder blade to port and thus the boat alters direction to port (Fig. 13).

Fig. 12 also shows how the pressure of the water on the blade of the rudder tends to swing the stern of the boat sideways, thus turning the boat's head to a new course. A boat pivots at a point just forward of centre.

When going astern, the rudder acts in the opposite direction, so when going astern, if you turn the helm to port, the stern of the boat will swing to port, and the bows will come round in a starboard direction. It is important to remember this.

to brake your approach in running water.

If your boat is not fitted with reverse gear, throttle down a good distance from the landing point and use the tide to carry the vessel in. As long as the vessel has some weigh on, the rudder can be used to help steer the boat. When circling round to make the desired approach remember to give way to other water traffic as required by the rules.

CASTING OFF

CASTING OFF from a jetty in a runabout presents no problem, once you have made sure the coast is clear. Casting off from shallow waters is most generally accomplished by removing your footwear and pushing the boat out, scrambling aboard when there is enough water to float her.

Figs. 15 and 16 show how to get away from a jetty when the tide is ahead or astern.

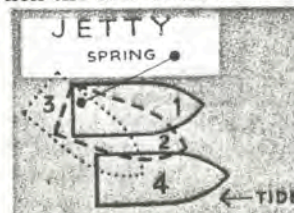


Fig. 15 Getting away with tide or wind ahead.

1. Alongside, held only by spring.
2. Bow coming out from jetty.
3. Bow well out. Stern against jetty. Put rudder to port and stern will come away.
4. Craft clear of jetty. Slip spring and go ahead, adjusting rudder as necessary.

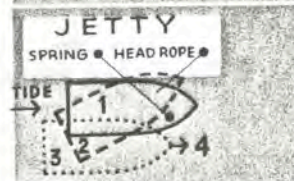


Fig. 16 Getting away with tide astern.

1. Alongside, held by head rope and spring.
2. Haul on headline, stern will swing out.
3. Ropes slipped. Going astern.
4. Going ahead.

Section 4: Boat and Equipment Maintenance

<u>PRACTICAL ACTIVITIES</u> 1. Electrolysis 2. Catalysis 3. Corrosion 4. Fibre glass 5. Batteries 6. Oils and lubricants	<u>STUDY ASSIGNMENTS</u> 1. Correct waste disposal 2. Fungi, anti fouling 3. Electrochemical series 4. Adhesives and glues 5. Paints and putties 6. Safety poster 7. Care of accessories and safety gear				
<table border="1"> <tr> <td colspan="2" data-bbox="379 869 1072 1420"> <u>CORE</u> 1. Reading and understanding the label 2. Following the instructions 3. Materials used 4. Buying at the best price 5. Basic trailer and motor maintenance </td></tr> <tr> <td data-bbox="95 1420 743 2029"> <u>DIRECTED TOPICS</u> 1. Display battery, motor 2. Retail shop v's corner store debate 3. Visit to school by person with boat, motor and tractor (if school doe snot own these) </td><td data-bbox="743 1420 1329 2029"> <u>AUDIOVISUAL</u> </td></tr> </table>		<u>CORE</u> 1. Reading and understanding the label 2. Following the instructions 3. Materials used 4. Buying at the best price 5. Basic trailer and motor maintenance		<u>DIRECTED TOPICS</u> 1. Display battery, motor 2. Retail shop v's corner store debate 3. Visit to school by person with boat, motor and tractor (if school doe snot own these)	<u>AUDIOVISUAL</u>
<u>CORE</u> 1. Reading and understanding the label 2. Following the instructions 3. Materials used 4. Buying at the best price 5. Basic trailer and motor maintenance					
<u>DIRECTED TOPICS</u> 1. Display battery, motor 2. Retail shop v's corner store debate 3. Visit to school by person with boat, motor and tractor (if school doe snot own these)	<u>AUDIOVISUAL</u>				

Objective	Resource
11.S.P. Make a list of materials that are needed to repair a part of a boat or engine, and price them	
12.S. Get the best value for money	
13.S.P. Select the correct spark plug and set of points for a motor	
14.S. Clean a spark plug and mix 2 stroke fuel	
15.S. Charge a shear pin on a prop.	
16.S. Detect a worn "o" ring and replace it on a fuel line	
17.S. Remove a cowling and use water repellent spray to clean an engine	
18.S. Flush a motor	
19.S. Winch a boat onto a trailer	
20.S. Change a tyre on a trailer	
21.S. Remove and pack a trailer bearing	
22.S. Charge a 12v or 6v battery and top up if necessary	
23.P.A. Recognise the need to understand electrolysis.	Notes p.
24.P. Apply to new situations the things you have learned in this section	
25.C. Spelling	

CORE1. Reading and understanding the Label

It has often been said, that, when
all else fails

READ THE INSTRUCTIONS!!

It seems to be a common human trait to ignore the instructions. Not that people mean to...it is just that we get a little overenthusiastic and want to get our hands on.. You can save yourself a great deal of frustration and agony by carefully reading the manufacturer's instructions.

Activity 1: Reading Labels

You will need: A range of different labels or instructions for products in the repair and maintenance category.

Get the labels from:

- R.P.7 or WD40 (water repellent)
- Liquid glue
- fibre glass repair kit
- tin of paint
- mineral turps container
- thinners container
- cement bag
- liquid paper bottle
- araldite
- bike repair kit, etc.

Draw up the following table and complete:

Product Name	Use	Expiry Date	Contents	Cautions	Directions for use

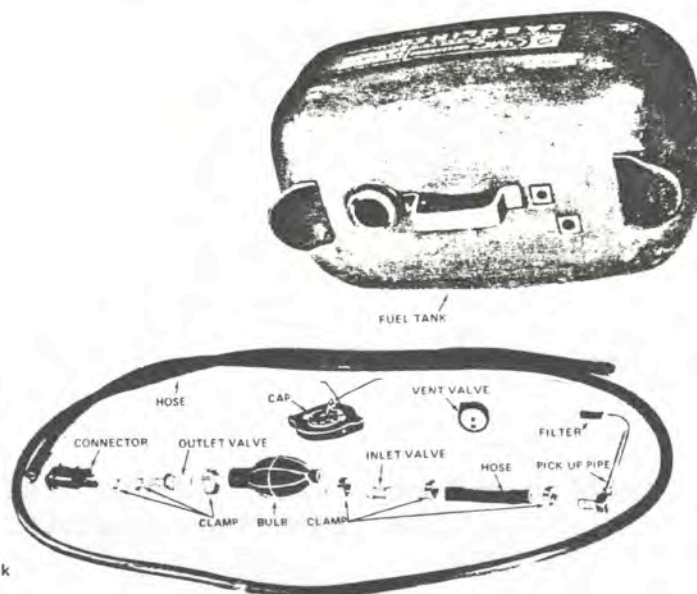
1. Take the labels and copy down all the headings. You will find heading like: important, caution, instructions for use, directions.
2. When finished go and write them on the board.

3. Now find the manufacturer's name. Make a list.
4. Find the expiry dates
5. Find out the danger associated with the product.
6. Find out the correct disposal method for the product.
7. Find out the content of the product.

Analysing your results:

1. What sort of uses did you find products for?
2. Which product expiry dates were shorter? longer?
3. What product had the greatest number of contents?
4. Which products were flammable?
5. Which were corrosive and which were poisonous
6. Which product labels included first aid information?
7. Which products do your mates fool with by sniffing?
8. How many people die form sniffing such products?
Do you understand the contents of these products
and their specific dangers?
9. Which product required cleaning up after use?
10. Which product needed to be stored carefully?

Class discussion: Make a report to the class
on your findings.



Exploded View of Fuel Tank
Components. 5 hp Model.

(courtesy Johnson)

2. Following the instructions

This section will indicate if you can follow instructions. The material is drawn from Exploring Science 3, by Stannard and Williamson. You are to complete the experiment without any instructions from your teacher.

- (1) Making a polymer: p.114, 115.
or (2) Making soap: p.121, part A only

Your teacher will have the following checklist which he/she will use to assess your efforts. Your teacher will determine these steps:

- (1) Followed step 1 correctly ☐
(2) Followed step 2 correctly ☐
(3) Followed step 3 correctly ☐
(4) Followed step 4 correctly ☐

This exercise shows you the importance of following instructions to the letter

In each case, write a short report indicating when the reaction started and stopped; i.e. when soap was started to be made, and when it was made

TO INSTALL DRIVE PIN ON LATE 6 HP MODELS

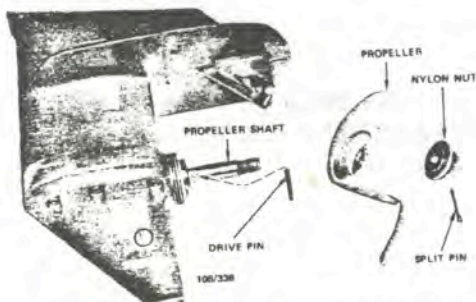
- (1) Withdraw the split pin and remove the propeller retaining nut by unscrewing from the propeller shaft.
- (2) Take off the propeller and remove the drive pin from the propeller shaft.

If the drive pin has sheared then remove the three broken pieces of the broken drive pin.

- (3) Turn the motor in the normal direction of rotation until the drive pin hole in the propeller shaft is horizontal.
- (4) Instal a new stainless steel drive pin and centre the pin in the propeller shaft.

NOTE: In an emergency a broken drive pin can sometimes drive the propeller if the three pieces are rearranged in the propeller shaft.

- (5) Instal the propeller so that the drive pin engages with the cutaway section in the propeller hub.
- (6) Instal the propeller retaining nut and securely tighten by hand. Using a suitable spanner tighten the nut to align the split pin hole with the hole in the shaft.
- (7) Instal a new stainless steel split pin and bend the ends over the nut.



Propeller and Associated Components. Late 6 hp Model.

LUBRICATION (5 HP MODELS)

Gearcase

Check the lubricant level in the gearcase every 50 hours of operation. Add lubricant as necessary. Completely drain and refill the gearcase once each season or every 100 hours



(courtesy Johnson)

Method of Filling Gearcase with Recommended Lubricant. On 6 hp Models it will be necessary to top up the Gearcase via the Level Hole using Part of a Second 8 oz Tube of Lubricant.

When you mix anything together there is always a time factor involved. Some reactions happen very fast, and you need to work quickly, for example: fibre glassing involves the use of a resin and catalyst.

A catalyst makes the resin go hard. If you don't get your fibre glassing finished before your resin goes hard, you end up in a real mess.

Some reactions are completed before you start to use the product. For example, there are many rubber products that only adhere to other rubber products when dry. The instructions will say to wait until the rubber mixture is dry before attempting to stick the two surfaces together. Car tyres are repaired in this way.

Correct disposal of many of these products is very important. Often you will see on the container "DO NOT INCINERATE CAN".....You might like to discuss this point.

3. Materials used activity

You will need to make a 'materials used' board for this section. You should have collected small pieces of materials that are used in boats or motors. A good place to scrounge these is from a boat builders waste bin, but see him first before entering private property.

Make a display board, or alternatively you may want to keep a loose leafed folder type arrangement where you use contact to hold your items in place.

For each piece of material you are to complete the following outline:

Name of material:

Area of Use in Boat:

Advantages of using it there:

Disadvantages of use:

Maintenance required:

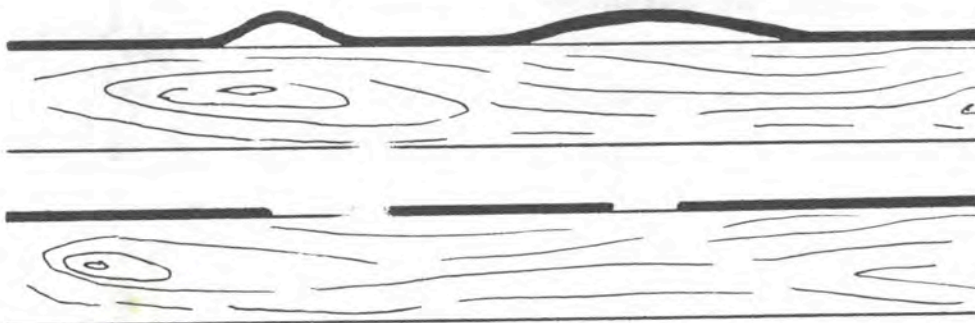
Cost (per sq.m. or per item):

A minimum of 20 material samples are to be collected. Use the following table to help you select the materials.

TABLE OF BOAT MATERIALS

Materials:	Timber Fibreglass Plywood Aluminium Steel Concrete
Fastenings:	Bronze Brass Copper Monel Galvanised Iron Stainless Steel Lead
Paints:	Water based Oil Based Varnish
Fillers:	Putties Glues
Motors:	Rubber Porcelain Cork oil
Rigging:	Wire Rope Canvas
Safety:	Foam Plastic

Cross section of paint skin showing blistering due to moisture (top) and effect of water (bottom)



4. Buying at the Best Price

For a trip to your trip to your local hardware or retail store you will need up to $\frac{1}{2}$ day, depending on how far you need to travel.

Usually items are cheaper at the large retail shop which have a higher turnover based on a smaller profit margin. However, shopping around for the best price often produces some startling results. Getting a good deal not only saves you money, but can make you feel good too.

The trouble with the large chain stores is that you have very limited assistance in buying your items, and you must know EXACTLY what you want, or you will waste not only your time, but the transport cost in getting there.

Activity: Buying a spark plug

These are available from many places.

Make the following decisions:

- (1) Which motor needs the spark plug.
- (2) Where are you going to buy it.
- (3) Expected cost.
- (4) Is it cheaper to drive to a retail outlet?
or a local garage?
- (5) What are the advantages and disadvantages of either?
- (6) How much service do you get at a retail store?
at a local store?

Make a list of other materials you would buy from the retail store and then go out and price them.

On your return discuss the problems you encountered:

- e.g. - could you find them?
- out of stock?
 - long wait at checkout?
 - trolley had wobbly wheels?
 - priced every part?



5. Basic Trailer and Motor Maintenance

Your teacher will show you how to:

- (1) Clean a spark plug and set of points, set gaps.
- (2) Mix 2 stroke fuel
- (3) Change a shear pin on a prop.
- (4) Detect a worn "o" ring in a fuel line
- (5) Remove a cowling and spray motor
- (6) Flush a motor
- (7) Winch a boat onto a trailer
- (8) Change a tyre
- (9) Remove and pack a trailer bearing
- (10) Charge a battery

You will need some old motors. See if some are available from a local boat shop. Failing this, perhaps you can borrow a boat for a day so that you can go through the above 10 points.

Practical Activities

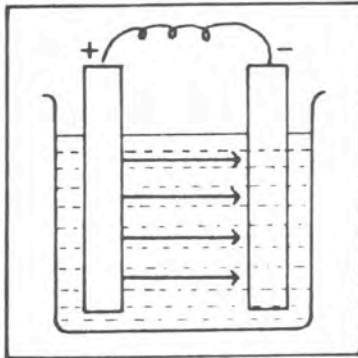
1. Electrolysis

To understand the process of corrosion it is necessary to look at the experiments undertaken in the study of elementary electricity. If a container is filled with an acid, or similar electrolyte, and into this solution two rods are immersed, one of copper and one of zinc, an electrical current is registered immediately these two rods are connected together. If the rods are left in the solution the electrical current will continue to flow from one to the other, i.e. from the anode (zinc) to the cathode (copper).

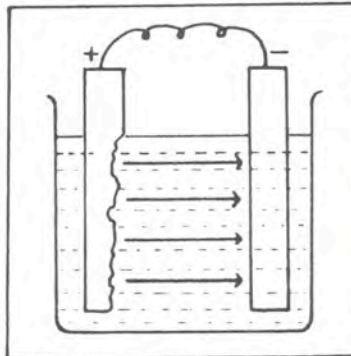
If the process is allowed to continue for an even longer time, a gradual wasting away of the anode will be observed until, eventually the anode disintegrates altogether. This is the action of corrosion, and in effect the wasting away of the zinc rod is the action of corrosion on zinc fittings or alloys in a boat where copper is in contact with zinc.

With the amount of zinc and copper alloys used for screws, bolts, fittings, masts, etc., it is small wonder that corrosion is a sizeable problem, one which cannot be ignored. The gradual disintegration of a propeller, for example, is not only expensive but also dangerous.

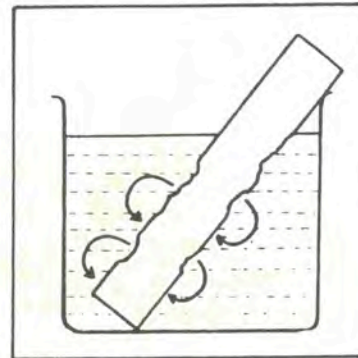
Electrolytic corrosion



1. Current flowing from anode to cathode through electrolyte.



2. Anode gradually disintegrating.



3. Action of rust showing current travelling between anodic and cathodic regions, corroding away the anodic parts.

CONSIDERING THEIR PERFORMANCE, THEY HAVE VERY SMALL APPETITES.

Since their introduction, the 60 and 40 have been two of the most fuel efficient outboards in the Mariner line.

The 40's new crankcase design, larger connecting rods and increased bearing size allow each bearing to run 10° cooler, extending its life significantly.

Both motors feature loop-charged induction for greater power, as well as superb fuel economy. Twin carburetors mix the fuel with air more efficiently than a single carburetor and manifold.

That improves economy, too. And the fuel mixture is ignited by a trouble-free capacitor discharge ignition system.



Sacrificial anodes in critical areas are designed to attract corrosion, so the rest of the motor won't.

Like our bigger models, both motors feature thru-prop exhaust which reduces underwater drag for better fuel economy. It also buries exhaust gases under water for quieter operation. And the 60 is available with dealer-installed Power Trim® as optional equipment.

As for their reliability, let's just say that, if there are tougher, more dependable outboards, they're still on the drawing board.

Courtesy: Mariner
Outboards

2. Catalysis

Many reactions involve the use of hardners or catalysts.

DO: Investigation 3: the section of Catalysts
Page 114 "Exploring Science 2"
Stannard & Williamson.

Answer questions 1 - 5 as well.

3. Corrosion

DO: Investigation 3: Galvanising Iron
Page 129 "Exploring Science 3"
Stannard & Williamson

Read pages 130 - 131 of the same book and discuss the electrical and chemical series.

4. Fibreglass (Teacher Demonstration)

- (a) Obtain a small amount of fibreglass mat, resin and hardner
- (b) Find out what proportions of resin to hardner to use

CAUTION: The hardner is very dangerous and will cause blindness if you get it in your eye.

- (c) Cut a small piece of mat and fibreglass a small wooden block

Questions

- (1) Study the effect of the hardner
- (2) What happens if too much hardner is added?
- (3) How much heat is involved?
- (4) How long does it take the mixture to go off?
- (5) Why is it important to check that no sinkers, hooks etc have been left lying around in an aluminium boat?

5. Batteries

- (1) Obtain an old battery and cut it up to display the cells and arrangement of plates
- (2) Obtain a battery charger and charge a 6V or 12V battery.
- (3) Can a power pack be used to charge a battery?
- (4) Find out how to read a hydrometer.
- (5) Find out how to claim on a faulty battery.
- (6) Learn to read an ammeter and voltmeter to check battery strength.
- (7) Why is petroleum jelly put on the battery terminal?

6. Oils and Lubricants

- (1) Obtain a range of oils and display them.
 - (2) Obtain a range of lubricants in spray or paste form. Make a chart or poster to display their uses.
7. Further research the properties of the metals and alloys used in the core. Consider the following:
- Physical properties: colour, lustre, harness, toughness, malleability, ductibility, conductivity of heat and electricity, specific gravity, melting point.
 - Chemical properties: Effect of exposure to air, effect of heating in air, reactions with water and saltwater, acids, alkaline, solvents (metho, kero plus organic solvents)

8. ASEP unit on metals, polymers.

9. Make a collection of the following metals and alloys: magnesium, nickel, copper, brass, bronze, lead, zinc, aluminium.
10. Test each with diluted hydrochloric acid and compare your results.
11. Make up a 35‰ (parts per thousand) solution of salt and immerse each in it. Note the changes after a few days; after a few weeks.

12. Purchase a quantity of nails and screws from a boat manufacturer workshop and study the effect of acid and salt as for number 11.
13. Find out about the electrochemical series and how sacrificial anodes work.
14. Do the activity on making a urea/formaldehyde polymer in Stannard & Williamson "Exploring Science 3".

Directed Topics

1. Find out how to best cut up a battery to display internal components.
2. You will have to have access to motors. See if you can help to build up the school's resources by getting an old motor donated to the school.
3. Arrange a class debate of retail chain v's corner shop.
4. Arrange an excursion to a boat retailer to look at the range and costs of boat accessories and fittings.
5. Arrange an excursion to a boat manufacturer to observe boats being made.
6. Make a collection of boat "bits and pieces".

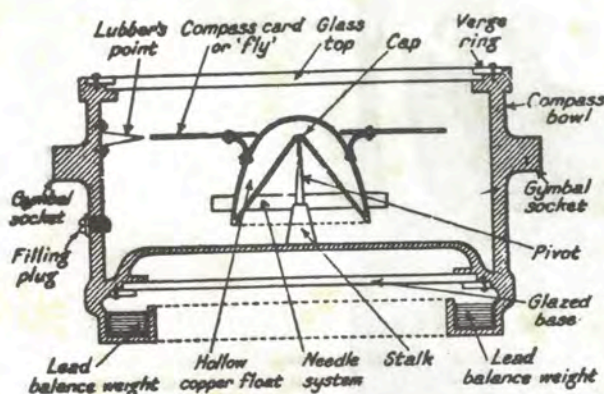


Fig. 12 - Section of a Liquid Compass

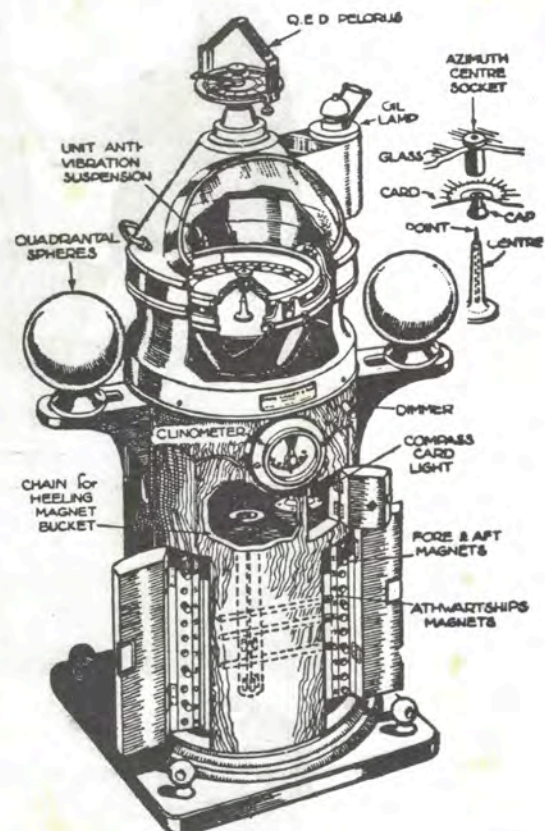


Fig. 13 - Section of a Standard Compass.

Study Assignments

Part A: "Exploring Science - Book 3"

1. Make a table of the electrochemical series (page 130)
2. Read the section on electrochemical corrosion (page 130). Answer questions 1 and 2 page 133.
3. Reasearch questions 3 and 5, page 133.
4. Try making the electrochemical cell. Page 134.
5. Try the "Something to do" ideas on page 107.
6. Read page 106 and answer questions 1 - 5.



DEPARTMENT OF HARBOURS AND MARINE QUEENSLAND

Option: Getting Your Boat Licence

<u>PRACTICAL ACTIVITIES</u>	<u>STUDY ASSIGNMENTS</u>
<u>CORE</u> (depends on numbers and the availability of boats) 1. Knowledge of Costs and approach to be made 2. <u>Theory</u>: (collision at sea, buoyage systems [navigation], local regulations, safety regulations, skiing 3. <u>Practical</u>: (going out, handling at speed, mooring and anchoring, recover an object from the water, attitude, returning to shore	
<u>DIRECTED TOPICS</u>	<u>AUDIOVISUAL</u>

OBJECTIVES	RESOURCES
1. Know the correct procedures on how to go about obtaining a boat licence. 2. Answer theory questions relating to (a) avoiding collision (b) buoyage system (c) local regulation (d) cost of registration (e) skiing (f) speed limits (g) diving flag (h) navigation lights (i) sound signals (j) skiing safety rules 3. Practice: (a) checking safety gear (b) connecting fuel tank (c) pushing off and lowering motor (d) starting motor and reversing out (e) engaging forward and handling at speed (f) tying up at pilon with tide or current (g) recovering an object from water (h) the right-of-way on the water 4. Demonstrate: (a) a generally safe and mature attitude (b) observing speed limits and navigation aids (c) avoiding collisions at sea (d) mooring or anchoring a boat (e) returning to shore correctly (motor off & up, idle in so as not to damage hull)	Harbour & Marine application forms Harbours & Marine pamphlets question and answers, Q.1-12 Pamphlet - local regulations Q. 20-31 Q. 32-34 Q. 35-35 Q. 37-40 Q. 41-43 Q. 44 Boat and Licensed person

CORE1. Knowledge of Costs and Applications to be made

Applications are obtainable from the Boating and Fisheries Patrol which are part of the Department of Harbours and Marine.

Page 6 of the Tide Book gives you the phone numbers or look up the Local Government numbers in the telephone Book.

Make sure you have copies of the following pamphlets:

1. Buoys, beacons and markers
2. Questions and answers to assist applicants undergoing speed Boat Drivers Test.
3. Water Skiing
4. Boating safety Starts with You.
5. Notes on Small Craft
6. Safety Equipment (Pleasure Yachts)

Here are some general notes:

1. The applicant supplies the boat
2. The applicant must be 16 years or over
3. To drive prior to a test, a licensed speedboat driver must be in the boat
4. All safety equipment applicable to the particular boat size must be in the boat.
5. Cost (1984) \$25 per person
6. It is recommended to have at least 5 hours boat driving experience before applying for a licence.

For further information, contact your local Boating and Fisheries Patrol Boat officers.

For current rates please contact the nearest office of the Department of Harbours and Marine.

MARINE BOARD OF QUEENSLAND — Application for Speed Boat Drivers License

(Given Names)

(BLOCK LETTERS)

(Surname)

(Address—BLOCK LETTERS)

POSTCODE

I declare that I do not suffer from any disease or any physical disability likely to effect efficiency in driving a SPEED BOAT having regard to the safety of the public generally and I declare further that the information herein is true and correct.

Signature of Applicant

Signature of Witness

Test Certificate Number

OFFICE USE ONLY

Amount Paid \$

Date

Receipt Number

License Number

I hereby apply for a Speed Boat Drivers License.
My description is as follows:—

Date of Birth

Place of Birth

Description—Height cms Colour of eyes

Colour of hair Complexion

2. THEORY QUESTIONS

(You will be asked these by the examiner)

DEPARTMENT OF HARBOURS AND MARINE
QUEENSLAND BOATING AND FISHERIES PATROL**Questions and Answers
To Assist Applicants Undergo
Speed Boat Driver's Tests**

The following terms shall have the meanings set against them respectively.

"Board" means the Marine Board of Queensland.

"Commercial water ski-ing" means water ski-ing other than private water ski-ing.

"Speedboat" means any motor boat or motor vessel powered by propulsion machinery of not less than 4.5 kw brake power or 6 horse power and capable of a speed in excess of 10 knots and with a hull which is designed to be a planing or non-displacement hull.

"Water Ski-ing" includes water ski-ing, aquaplaning and any similar activity carried out in association with a motor boat or motor vessel.

**THE FOLLOWING QUESTIONS AND ANSWERS ARE
PREPARED TO ASSIST APPLICANTS TO
SUCCESSFULLY UNDERGO A TEST TO DRIVE A SPEED
BOAT.**

Applicants will be required to give correct answers to all or any of the questions as set out.

- Q. 1. Which is the port side and which is the starboard side?
A. Looking towards bow, port left, starboard right.
- Q. 2. In narrow channels, which is the correct side of the channel for a power-driven boat under way?
A. The side on the starboard hand; keep to the right.
- Q. 3. A power boat is approaching you, end on, (head on) right ahead. What do you do?
A. Alter to starboard, pass him on my port side.
- Q. 4. A power boat is crossing your bow from starboard to port. There is a risk of collision. What do you do?
A. Keep clear, reduce speed or stop if necessary, pass astern. Do not pass ahead of him. Give way to the power boat on your right.
- Q. 5. A power boat is crossing your bow from port to starboard. There is a risk of collision. What do you do?
A. Stand on. Maintain course and speed. However, if the other boat does not give way take all action to avoid collision.
- Q. 6. A sailing boat is approaching you. There is a risk of a collision. What action do you take?
A. Keep clear of sailing vessels. A sailing vessel shall not, however, have the right to hamper, in a narrow channel, the safe passage of a power-driven vessel which can navigate only inside such channel.
- Q. 7. You are approaching at speed an anchored dinghy in which people are fishing. What do you do?
A. Steer to pass more than 30 metres off. If this is not possible owing to narrow waterway, reduce to idling speed (4 knots) until past and clear.
- Q. 8. You are approaching a bank and see bathers where you want to beach your boat. What do you do?
A. Steer clear. If within 30 metres reduce to idling speed. If very close to bathers, cut the motor.

- Q. 9. You are approaching a ferry. What do you do?
A. Always keep clear of ferries.
- Q. 10. You are in a main shipping channel. A large vessel is approaching. What do you do?
A. Always keep out of the way of larger vessels.
- Q. 11. You are approaching a professional fisherman engaged in fishing. What do you do?
A. Keep clear of all fishermen.
- Q. 12. You are overtaking another vessel. What action do you take?
A. An overtaking vessel must always keep out of the way of the vessel being overtaken until finally past and clear.
- Q. 13. What do you consider essential requirements for the safety of persons carried in your boat?
A. Safety equipment as required by the Navigation (Equipment of Pleasure Yachts) Regulations.
- Q. 14. What license do you require to hold to drive a speed boat and/or speed boat engaged in water skiing activities?
A. A speed boat drivers license.
- Q. 15. Can any person other than a licenced driver, drive a speed boat? Yes, a person over the age of 12 years may drive a speed boat not engaged in water skiing activities when under the direct supervision of a licenced driver on board that speed boat.
- Q. 16. What should you do in the event of a Boating Accident?
A. Notify the Department within 48 hours and complete a Boating Accident Form which can be obtained from any Harbour Master's or Boating and Fisheries Patrol Office or direct from the Department of Harbours and Marine, Brisbane.
- Q. 17. How should your boat be marked?
A. Registration numbers on both sides in figures 200mm high, where they can be clearly seen.
- Q. 18. What is the minimum legal age for obtaining a license to drive a speed boat?
A. 16 years.
- Q. 19. When is the occupant of a speed boat considered to be safely accommodated, as required by the Regulations?
A. An occupant is considered to be safely accommodated only when that part of the occupant's body below the waist is enclosed within and below a safe railing, cockpit coaming or bulwark.

SKI-ING

- Q. 20. What special rules must you know in relation to water ski-ing?
A. Ski-ing signals and safety rules.
- Q. 21. How many persons may be carried by a speed boat when engaged in towing a water skier or water skiers?
A. The driver, observer and one assistant.
- Q. 22. Is there any exception when more than three persons may be carried?
A. Yes. When engaged in a competition or exhibition event approved by the Board when no more than four persons (including the driver), may be carried at one time.
- Q. 23. Where may vessels be used for water ski-ing?
A. Only in those waters which have been approved by the Board for water ski-ing.
- Q. 24. What is the minimum distance a water ski boat or skier is permitted to approach?
(a) A bank or shoreline in a River, Creek, Lake, Dam or Inland Water.

- (b) Any structure not used for water skiing — any boat ramp — any moored or anchored vessel — any person bathing or fishing in a **River, Creek, Lake, Dam or Inland Water**.

A (a) 15 metres
(b) 30 metres

Q 25. What is the minimum distance a water ski boat or skier is permitted to approach?

- (a) The shoreline or any structure not used in water skiing — any boat ramp — any person bathing or fishing in **open bay waters or the open sea**.
(b) Any anchored or moored vessel in **open bay waters or the open sea**.

A (a) 50 metres
(b) 100 metres

Q 26. What is the duty of an observer?

A To keep the water skier under observation at all times and report to the driver of the vessel on all matters affecting the towing of the water skier.

Q 27. What is the minimum age of an observer?

A 15 years

Q 28. How many water skiers may be towed by a vessel?

A No more than two or as approved by Board for the particular area

Q 29. How may water ski boats may use an approved area at any one time?

A The number approved by the Board for that particular area. This number is usually shown on signs on the bank.

Q 30. When more than the approved number are waiting to use the area how long may the driver of a water ski boat continue to tow water skiers in the area?

A 30 minutes. Ski boat drivers shall rotate their turns in order of arrival at the skiing area.

Q 31. What action should be taken when there is no signal from a fallen skier?

A The observer and driver should take immediate action to assist the skier.

SPEED LIMITS

Q 32. What is the speed limit in a boat basin or through boat anchorages?

A Idling speed or, where gazetted, at speed indicated. Usually 4 knots.

Q 33. What is the speed limit for speed boats in most small rivers and creeks?

A Usually 6 knots, sometimes 4 knots.

Q 34. Under what circumstances may a speed boat exceed the limits applicable to displacement hull vessels.

A (i) Speed boats not exceeding 6 metres in length in most cases may proceed at a faster speed than displacement hull boats.
(ii) The owner of a speed boat exceeding 6 metres in length must first have and obtain the approval in writing of the Board.

DIVER FLAG

Q 35. Describe the International Code Flag 'A'.

A Flag 'A' is a burgee (a square flag with two tails) divided vertically into a white half and a blue half. Blue to the fly.

Q 36. In the event of the International Code Flag 'A' being shown on any craft or buoy, what does it mean and what action do you take?

A It means that a diver is down in the vicinity. Keep well clear at slow speed.

LIGHTS

Q 37. What regulation lights are carried within the waters of jurisdiction by

- (a) A sailing vessel?
(b) A power driven vessel?

A (a) Port (red) starboard (green) and stern (white) lights
(b) Every power-driven vessel having a length not exceeding 7 metres shall carry and exhibit red (port) and green (starboard) side-lights and a white all round light. Such white light shall be carried at a higher level than the side lights.

Q 38. What regulation lights are carried by cross river ferry services?

A Two green lights, one exhibited at each end of the vessel.

Q 39. What regulation lights are carried by cross river ferry services in the Brisbane river?

A (a) Whilst vessel is at pontoon two green lights, one at each end of vessel.
(b) Whilst vessel is underway a red flashing light is exhibited in addition to the two green lights.

Q 40. What lights are carried by a vessel when engaged in trawling?

A Whilst engaged in trawling a vessel carries in addition to the normal lights, two lights in a vertical line, the upper light being green and the lower white. But if the vessel is engaged in fishing other than trawling the upper light is substituted by red.

SOUND SIGNALS

Q 41. When vessels are in sight of one another what is indicated when a power-driven vessel underway makes

- (a) One short whistle or siren blast?
(b) Two short blasts?
(c) Three short blasts?

A (a) I am altering my course to starboard.
(b) I am altering my course to port.
(c) My engines are going astern.

Q 42. What is the signal indicating a vessel is proceeding up river or approaching any bend going up river.

A One short blast followed by a long blast on the whistle or siren.

Q 43. What is the signal indicating a vessel is proceeding downstream or approaching any bend proceeding down river?

A One long blast followed by a short blast on the whistle or siren.

SKI-ING SAFETY RULES

TIP FOR SKI MUST BE SHOWING OR BOAT DRIVER SHALL NOT START

No signal from the fallen skier calls for immediate action from the observer and the driver.

After a fall, skier should clasp hands over head if unhurt until seen by the boat driver.

Fallen skier getting into boat should leave skis and swim towards boat.

Driver should stop engine before picking up skier from the water.

Skier should enter boat over stern whenever possible.

Skiers must wear an approved buoyancy vest made to Australian Standard Specification.

3. Practical Exam

Any examiner will look for confidence and maturity. Make sure you develop these skills to the fullest.

The practical exam will consist of a number of steps. Broadly speaking these can be divided up as follows:

(in all cases, take your time and think carefully)

(1). Going out

Practise the following skills:

- (a) pushing off, getting into the boat, and lowering the motor
- (b) starting the motor and reversing out
- (c) easing down the throttle and putting into forward gear
- (d) accelerating off slowly and bringing the boat onto the plane
- (e) knowing how to bypass other boats and avoid collisions.

(2). Mooring at a pylon

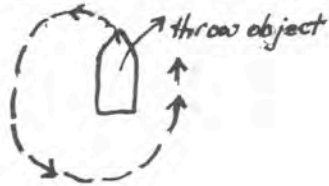
This requires practice in judging distance; being able to slow the boat and idle up to a final point without ramming the pylon or damaging the boat.

PRACTICE THESE SKILLS

- * Decelerating, idling, and gliding the boat for a fixed distance
- * When you have worked out how far your boat glides after decelerating, then try coming up to the pylon.
- * Take your time and don't come in too fast; also come in against the tide.
- * You will have to glide in and come to the bow of the boat and take the bowline
- * Wrap the line around the pylon and tie a Round Turn and two half hitches
- * Let the boat swing with the tide
- * Now, cast off; restart the motor, and move off.

(3) Recovery of Object from the water

- (i) Throw life jacket or empty cordial bottle into the water to starboard.

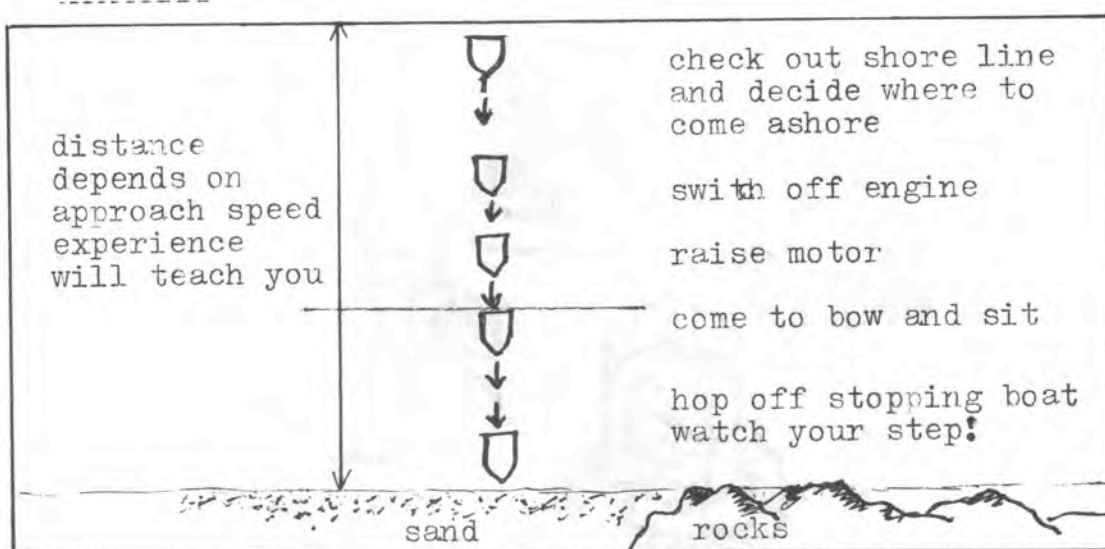
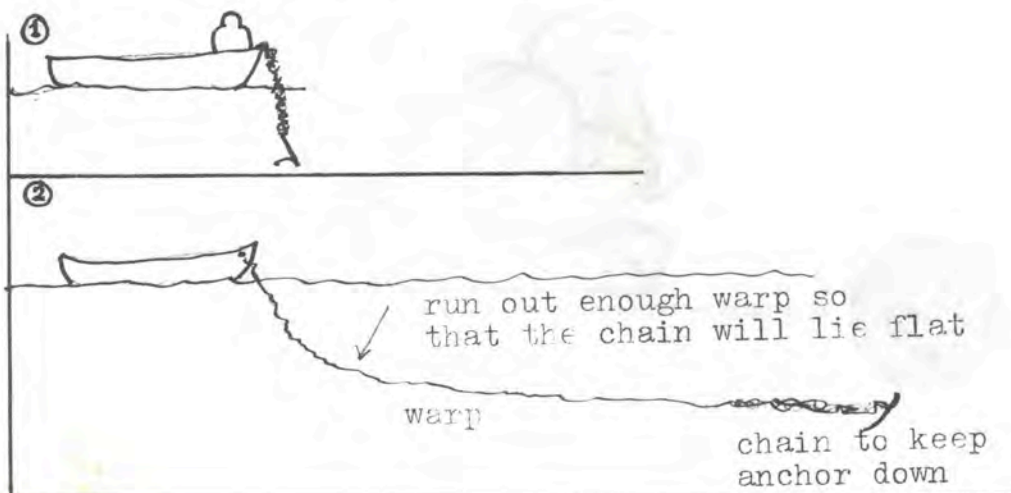


- (ii) Turn to port on coming up to the objects, then to starboard.
- (iii) Recover object while idling.

(4) Coming in

- (a) to jetty: Practice the skills outlined on page in Section 3.

- (b) to shore:

5. Anchoring, Mooring

6. Other hints

(i) At the ramp: Make sure you are cautious and considerate of other boaties. Draw up a list of "do's" and "don'ts" at the boat ramp.

(ii) Tell someone what you are doing:

- Where you are going
- When you are going
- When you are coming back
- Who you have with you

AND....stick to the plan. If you are overdue people will search for you whether you like it or not. So be responsible and do the right thing!



DEPARTMENT OF HARBOURS AND MARINE QUEENSLAND

REVIEW QUESTIONS

(1) Safety questions:

1. The first thing to do when bad weather approaches is to _____
2. A bar crossing should only be attempted by _____
3. A distress message on a radio-phone (or other) is introduced with the words: " _____ "
4. What are the 3 morse code letters? _____
5. When and how should a V sheet be used? _____
6. Name 4 common reasons for boating accidents. _____
7. What is the first thing to do when someone falls overboard? _____
8. What is the number 1 cause of fatal boating accidents? _____
9. What should you do if your boat capsizes? _____
10. What are flares, and how should they be used? _____
11. When should an accident report be submitted to Harbours & Marine? _____
12. Flag alpha over a boat or buoy means what? _____
13. What should you do when anchoring a boat? _____
14. When the anchor bites, you should pay out anchor warp equal to _____ times the depth of water.
- 15.

QUICK QUIZ 11

Your mate falls and breaks his arm in your boat. He sues you on the grounds that you did not have a non-slip deck surface. Does he have a case?



Look at this "happy family". Can you imagine a boating patrol officer intercepting this boat?

16. Complete the Table: You have your crew and gear on board.

10ft. tinny 17ft runabout

- (a) Are life jackets needed?
- (b) Are straps and other jacket fittings in good condition?
- (c) Should I do a short life boat drill for strangers?
- (d) Is an extinguisher in place?
- (e) Is its clamp rusted?
- (f) Does someone else need to know how to use it?
- (g) Do the fuel tanks and battery need to be secured?
- (h) Is a horn or whistle necessary?
- (i) Is the V sheet needed?
- (j) Are the flares in place; check the expiry date?
- (k) Is the engine at the right angle for the load?
- (l) Is it locked down?
- (m) Are fuel hoses connected and not leaking?
- (n) Is the steering working well?
- (o) Ignition key?
- (p) Bucket and lanyard?
- (q) Spare water?
- (r) First Aid Kit?
- (s) Oars or paddles?
- (t) Shear pins?
- (u) Spare prop?
- (v) Anchors?
- (w) Torch?
- (x) Signalling mirror?
- (y) Lunch?
- (z) Fishing gear?

How could you shorten this list?

17. What is the difference between a buoyancy vest and a life jacket?

18. How should you toss a life buoy to a swimmer?

19. How can you tell that life jackets are of the approved type?
20. At what age should children wear life jackets?
21. Shown below is a runabout with portable outboard tanks. The boat is 4.5m long. What type of extinguisher should she carry?



22. Shown below is a sketch of a 15m cruiser with a fixed CO_2 or BCF fire extinguisher. What type and how many extinguishers do you think this craft should carry?



23. Shown below is a sketch of a 9m motor-sailer. She has sails and an inboard engine and no fixed extinguishers. What type, and how many portable fire extinguishers should this boat carry?



GENERAL QUESTIONS

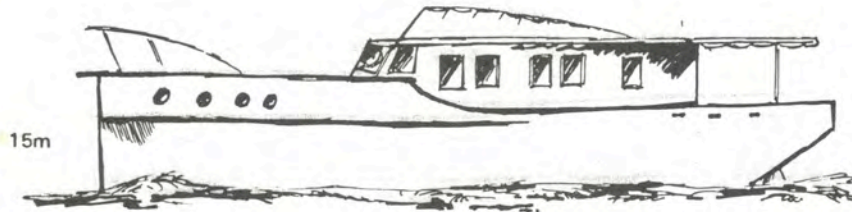
1. If you were backing down the ramp, how many people should be in the back seat?
2. At what speed should car and trailer be backed?
3. What position should the motor be in when launching? When retrieving?
4. Do boats have brakes?
5. A ramp should be approached at _____ knots.
6. You are 10 minutes in to a jetty. The tide is flooding.

Draw a diagram to show how you would moor the boat.

7. You have moored the boat and return to find the tide ebbing at 3 knots. How should you depart?
8. Should you run aground in mud? What should you do?
9. Your prop does not turn when you turn up the throttle. What could be wrong? How should you fix it?
10. If you run aground, what should you do before you get out?
11. You are about to leave home for a few days' boating. List the 4 items of essential information (the 4 "W's") you should remember to do.
12. When is petrol in its most dangerous state? Liquid or vapour? Why?
13. What does priming the motor mean?
14. What does choking the motor mean?
15. Where do you find out what the day promises?
16. Where can you get a quick weather check (ashore) at any time?
17. Boats are divided into _____ classes.
18. The classes are?
19. What is the determining factor for a boat class?
20. List the classes and give their dimension restrictions.

21. Identify these boats and place them in the basic categories.

(a)



(b)



(c)



(d)



Boating Certificate

(Note: This does not replace a boat licence)

This is to certify that _____
 of _____ State High School, having fulfilled the
 conditions prescribed over, has attained the
 following levels of achievement.

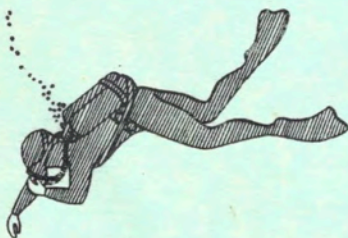
	<u>Achievement level</u>
Basic knowledge of Boats and Rigging	_____
Elementary Seamanship	_____
Basic Boat and Equipment Maintenance	_____
Safety and Survival Skills	_____
Attitude towards Boating	_____

School Principal_____
Subject Teacher_____
Date

VHA: 85%+ HA: 70%+ SA: 50%+ LA: 30%+ VLA: -30%
 Attitude: Satisfactory, unsatisfactory



**BENOWA STATE HIGH SCHOOL
MARINE STUDIES PROJECT
Mediterranean Drive
Benowa Q 4217**



**WITH COMPLIMENTS
Bob Moffatt
Phone: (075) 394222
(075) 394187 (A/H)**



SCIENCE TEACHERS ASSOCIATION OF QUEENSLAND

(Incorporated in Queensland)

c/- Brisbane Education Centre PO Box 84 Spring Hill 4000

Mr Bob Moffatt
c/- Benowa Marine
Benowa S H S

14 June 1984

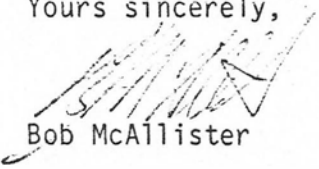
Dear Bob,

STAQ acknowledges that the "Marine Science" units which it first published were exclusively your work and that copyright resides in you. You are therefore free to authorise any other publisher to produce those units.

Accordingly, I advise that STAQ Publications will sell out its remaining stock of units and will then not offer the materials for further sale. The Council believes that the best interests of members will be served by advising them that you are now the sole distributor.

May I take this opportunity to wish you well in your innovative venture with Benowa Marine.

Yours sincerely,



Bob McAllister

MARINE SCIENCE SERIES

OTHER UNITS

UNIT 1 : Coastal and Estuarine Navigation

UNIT 2 : Coastal Physics

UNIT 3 : Coastal and Estuarine Biology

UNIT 4 : Estuarine Chemistry

UNIT 5 : Field Methods

UNIT 6 : Reef Ecology (In Press)

UNIT 7 : Snorkeling

UNIT 8 : Introduction to Boating

IN PREPARATION

UNIT 9 : Sun Cancer

UNIT 10 : Mangrove Ecology

UNIT 11 : Rocky Shore Ecology

UNIT 12 : Social Issues involved in Coastal Management