

# **MASTER 24 Mtrs NAVIGATION INDEX**

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# Charts and Publications

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## Position and direction on the Earth's surface

In order to define the exact position on the Earth's surface it is necessary to have two co-ordinates. Those used are Latitude and Longitude. Position may also be expressed in relation to a known geographical position.

Example 15 miles East of Burnett Head Lighthouse.

Both Latitude and Longitude are given in the units

DEGREES (°) MINUTES ( ' ) SECONDS ( " )

### Latitude

There is one plane which perfectly bisects the earth midway between the two poles. The line formed where this plane meets the surface of the earth is called the equator.

All lines on the earth's surface which run parallel to the equator are called ***parallels of latitude***. They are named north or south depending on which side of the equator they lie.

Latitude is measured by the angle at the earth's centre between the place in question and the equator. Latitude is therefore between  $0^\circ$  and  $90^\circ$ , north or south.

Angle BAC (or arc BC) is the latitude of C

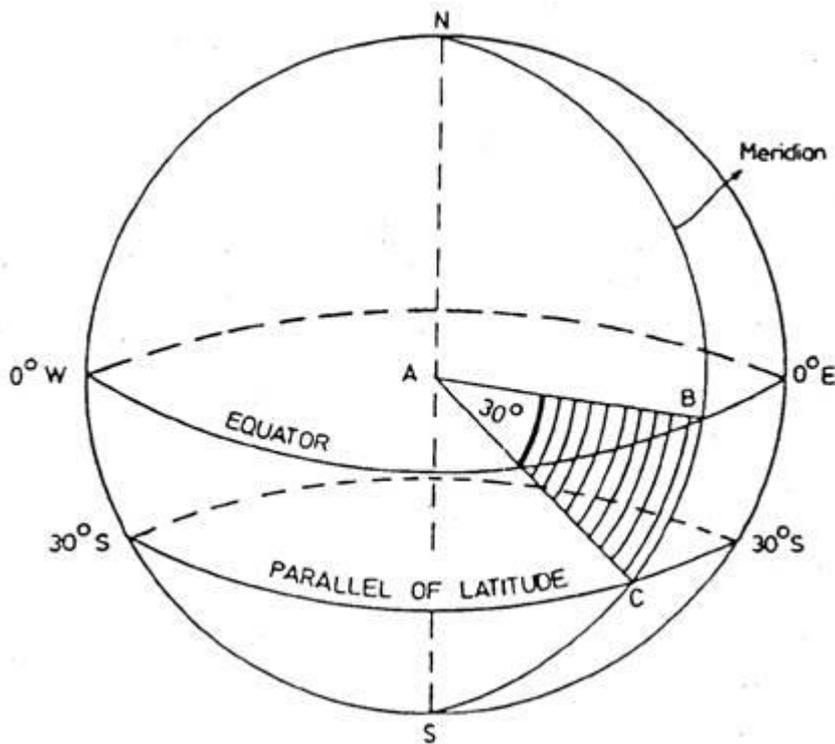


Figure 1: Definition of Latitude

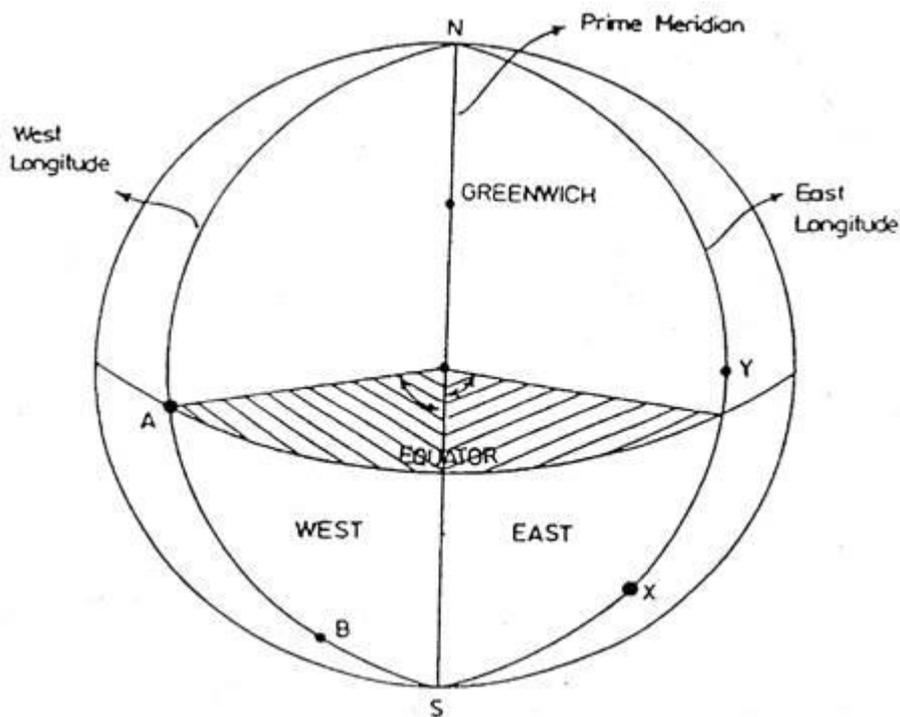
## Longitude

There are a great number of circles which pass through both poles and form circles on the earth's surface. These circles cut the equator and all parallels of latitude at 90 degrees. They are called meridians. Unlike the measurement of

latitude there is no natural reference point. The reference meridian selected is that which passes through the old observatory at Greenwich in England. It is called the Greenwich, or Prime meridian.

All other meridians are named east or west, from 0° to 180°, depending on the angle at the earth's centre between the prime meridian and the one in question. This provides the second co-ordinate, called longitude.

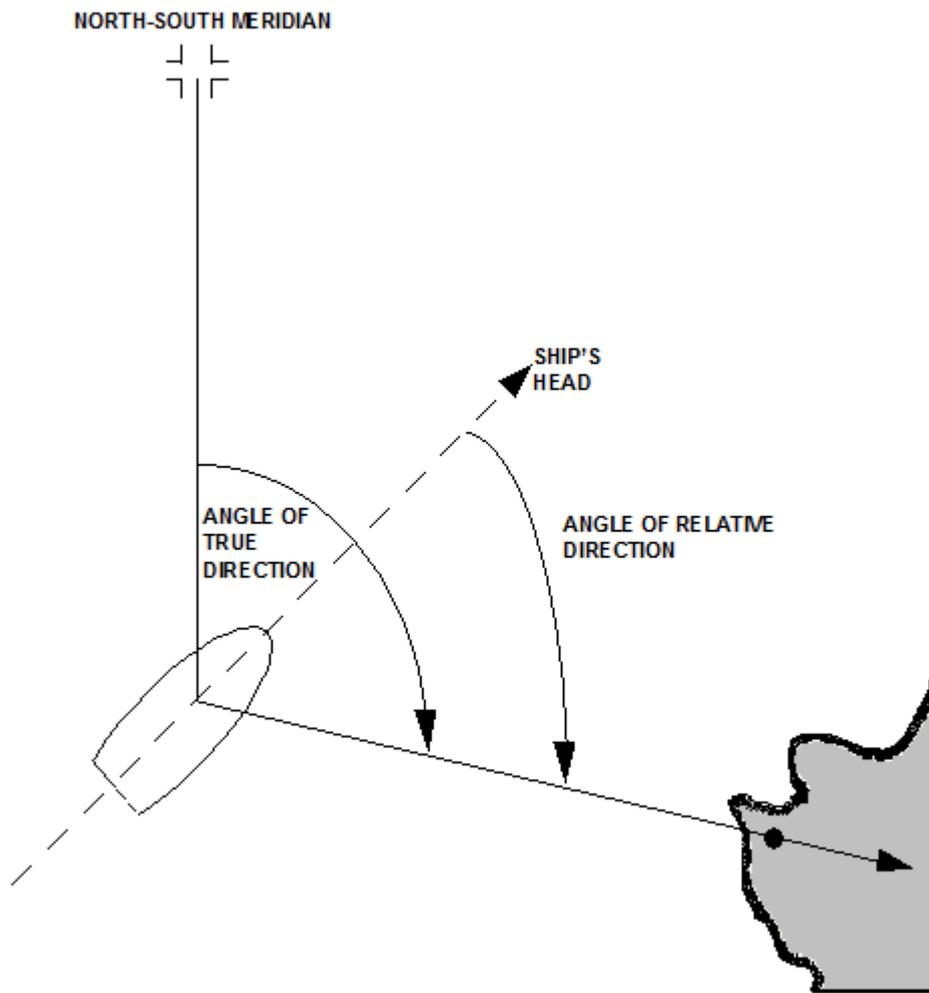
***The longitude of X and Y is the same, as is the longitude of A and B. (Note that the angle could be measured at any point on the earth's axis, including either pole).***



*Figure 2: Definition of Longitude*

## **Direction**

Direction is the position of one point relative to another, customarily expressed as the angular difference in degrees, usually from NORTH or the SHIP'S HEAD, without reference to the distance between them.

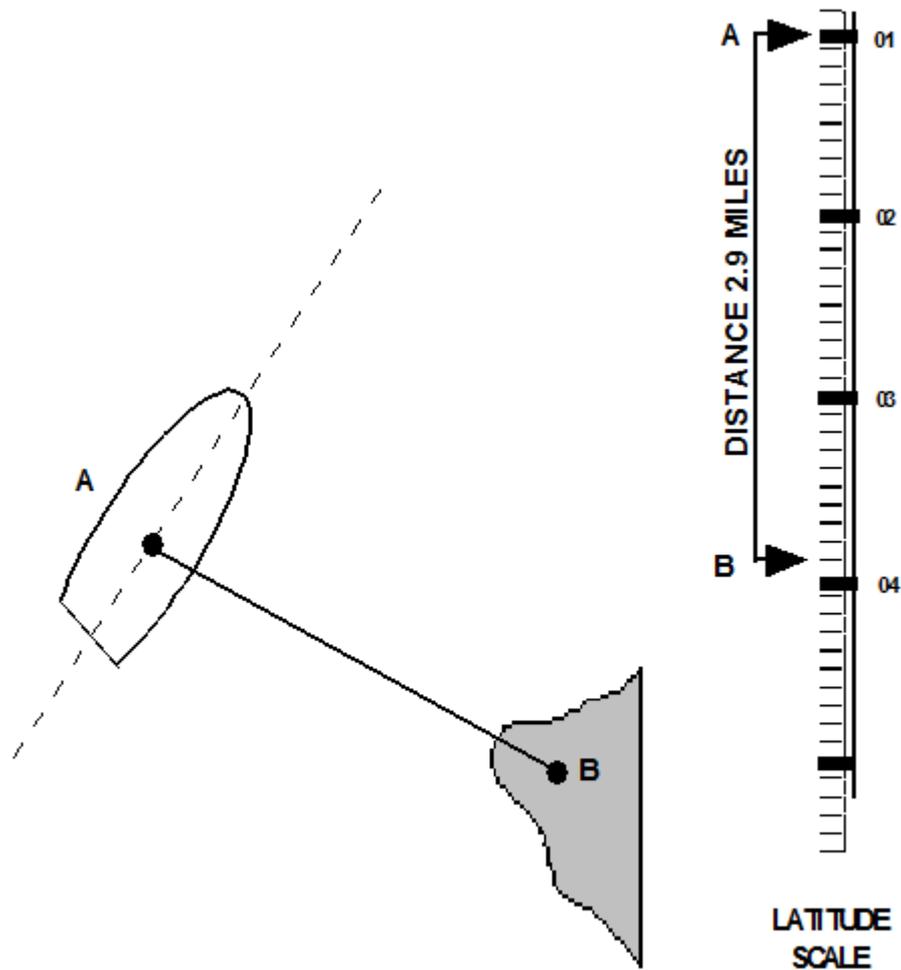


*Figure 3: Definition of Direction*

On the navigational chart the direction in which a place or object lies from the vessel is called the true bearing and is measured from NORTH ( $0^\circ$ ) in a clockwise direction through  $360^\circ$ .

## **Distance**

Distance on the earth is customarily expressed in Nautical miles by Mariners, and is the spatial separation of two points, in this case A and B.



*Figure 4: Definition of Distance*

For most navigational purposes the nautical mile is considered to be the length of 1 minute of Latitude and this is the scale one should use.

NEVER use the Longitude scale to measure distance.

## **Properties of a Mercator Chart.**

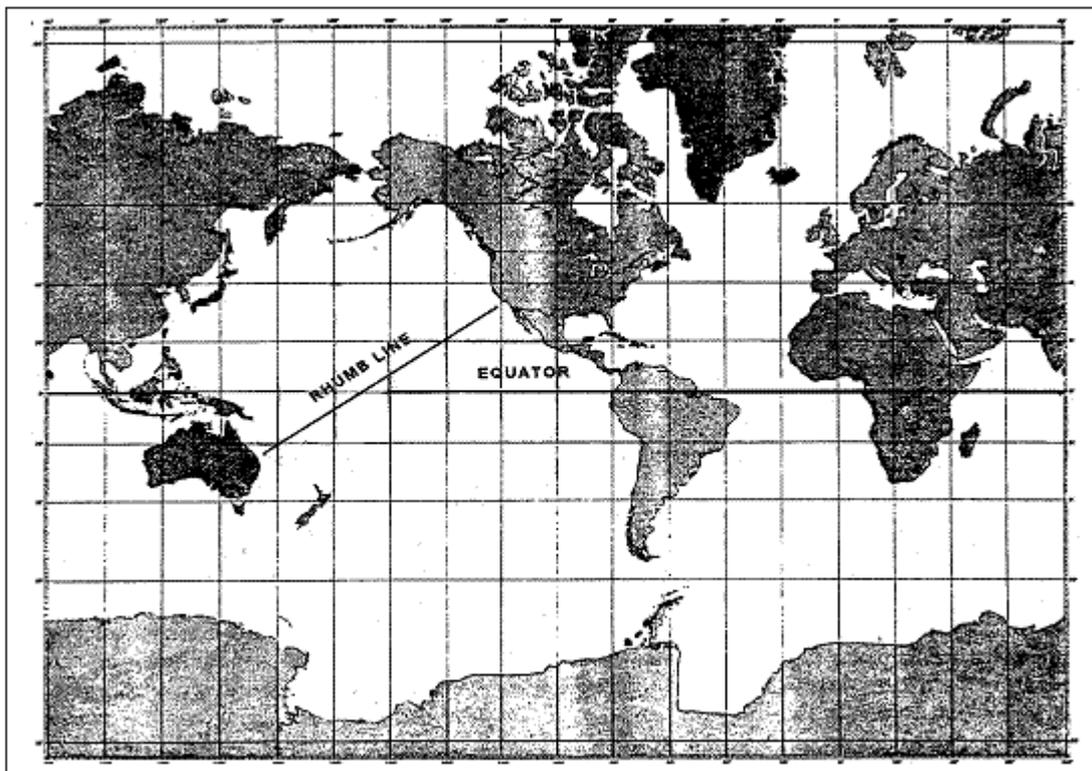
The navigator is required to find the following characteristics in a chart:

Coast lines should retain the same shape as they have on the Earth's sphere.

The lines of Latitude and Longitude should be east - north and west - south respectively. They should cross at right angles as on the sphere.

A straight line drawn on a chart between any two places should give the distance and direction between them. The angle at which this line cuts any meridian should give the TRUE course to steer.

The chartmaker has the problem of representing the rounded surface of the earth on a flat piece of paper. To some extent this is satisfied in the Mercator projection, but not without distortion of Land Mass sizes, unless they are near the Equator.



*Figure 5: World Mercator Projection*

Example Greenland is smaller than Australia on the Globe, but appears on the Mercator projection as the same size.

The main feature of the Mercator projection is that both meridians and parallels are expanded at the same ratio with increased latitude. Expansion is the same in all directions and angles are correctly shown. Rhumb lines appear as straight lines, the directions of which can be measured directly on the chart (angle  $2^\circ$ ).

Bearing and course lines are Rhumb lines.

Distances can be measured directly, for practical accuracy, but not by a single distance scale over the entire chart.

The latitude scale is customarily used to measure distances, the expansion of the scale being the same as that of distances at the same latitude.

## **Locating and Identifying Navigational Charts and Publications.**

We will first consider the various publications.

Certain publications are necessary to supplement the information a navigator can obtain from the chart.

### **Sailing Directions (Pilots)**

These are intended to be read in conjunction with the charts quoted in the text. They are published by the Hydrographer of the Navy or by Local Government. The latter generally being more up to date.

They need to be kept up to date by the latest supplement and Notice to Mariners.

An example of the title and contents is shown on the following page.

## Sailing Directions (Pilots)

# AUSTRALIA PILOT

## VOLUME III

**East Coast of Australia from Outer North Head to Cape York, including the Great Barrier Reefs, islands and reefs of the Coral Sea, Great North East Channel, Torres Strait, and the south coasts of Papua and Irian Barat between Parama Island and the meridian of 140° 40' E**

SIXTH EDITION

1973

*Charts Aus. 247, 345*

### **Fitzroy River**

**Fitzroy River** is entered through three channels. The main channel is through Sea Reach, and thence through South Channel; **Middle Channel**, which is closed to navigation, and **North Passage**, which can only be used by small vessels with local knowledge.

Owing to the shifting nature of the shoals and the general intricacies of the channels in Fitzroy River, those without local knowledge should not attempt to enter without a pilot.

The limits of the **Port of Rockhampton** are bounded seaward by a line joining Sea Hill and Cattle Points to a  $\frac{1}{4}$  mile below the **Fitzroy River Barrage** above Rockhampton, including all rivers, creeks and

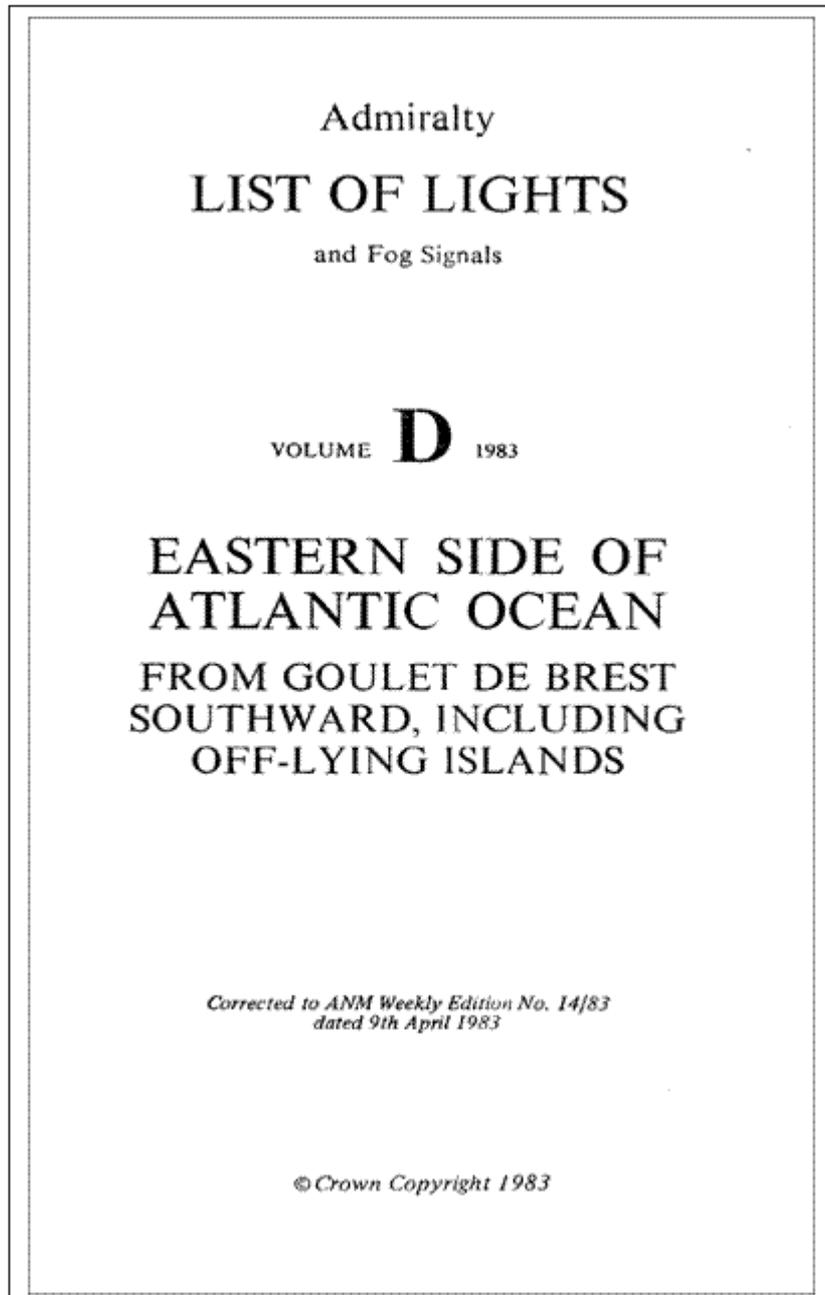
## Admiralty List of Lights

These give full details of all official navigational lights and are available from Hydrographic Office.

They are corrected from Australian Notices to Mariners issued fortnightly. See an example of a cover sheet on the following page.

Each light within the book is given a number, Latitude and Longitude etc.

### ***List of Lights***



## **Tide Tables**

These are published digitally and annually by the Hydrographic Office covering all Australian Ports, Papua New Guinea and Solomon Islands.

Locally published tables are published by State Governments and often give other useful information.

(Example) Queensland Transport produce annually 'The Official Tide Tables and Boating Safety Guide'

This covers tidal predictions, the weather, fishing guide etc.

## **Notices to Mariners**

These are issued digitally and in fortnightly editions, numbered consecutively, by the RAN Hydrographic Service.

They contain corrections for the following.

Charts

Sailing Directions (Pilots)

List of Lights

Admiralty List of Radio Signals

The following pages give examples of corrections from Edition 30 (1996.)

They can be obtained free of charge from the Custom House or Shipping Offices.

# Australian Notices to Mariners

30 August 1996



EDITION 30

Australian Notices to Mariners are the authority for correcting Australian Charts.

## AUSTRALIAN NOTICES TO MARINERS

Notices 436-476 BA Pubn, 2525, 2526, 2532, 2649, 2652  
NZ 250-267

List of corrections to selected Sailing Directions

Published fortnightly by the RAN Hydrographic Service

ISSN 0155-6304  
Print Post Approved PP 224952/00017

R. J. WILLIS,  
Hydrographer, RAN

<b>SECTIONS.</b>	<b>I.</b> Australian, British Admiralty and New Zealand Notices to Mariners.
	<b>II.</b> Corrections to Admiralty List of Lights, Vol K.
	<b>III.</b> Navigational Warnings.
	<b>IV.</b> Hydrographic Reports.
	<b>V.</b> Corrections to Admiralty List of Radio Signals.
	<b>VI.</b> Corrections to Sailing Directions.

*The substance of these notices should be inserted on the charts affected.*

*Bearings are referred to the true compass and are reckoned clockwise from 000° (North) to 359°; those relating to lights are given as seen by an observer from seaward. The range quoted for a light is its nominal range. Fog signals are sounded only during thick or foggy weather, unless otherwise stated. Depths are with reference to the chart datum of each chart. Heights are above mean high water springs or mean higher high water, as appropriate.*

*The capital letter (P) or (T) after the number of any notice denotes a preliminary or temporary notice respectively, which are contained separately at the end of the permanent notices. A star (\*) adjacent to the number of a notice indicates that the notice is based on original information.*

*Blocks and notes are included after Section VI.*

**Mariners are particularly requested to notify the HYDROGRAPHER, RAN, Locked Bag 8801, South Coast Mail Centre, NSW 2521 (Fax 042-21 8599) immediately on the discovery of new dangers or suspected dangers to navigation; and for changes or defects in aids to navigation, notify AMSA (Fax 06-257 2036).**

Copies of these notices can be obtained from the HYDROGRAPHIC OFFICE, 8 Station Street, Wollongong, the Agents for the sale of Australian and Admiralty charts in Australia, and from the Australian Maritime Safety Authority (AMSA) Offices, in the major ports of Australia.

Copyright in Australian Notices to Mariners is owned by the Commonwealth of Australia. Except for the permitted exceptions below, no part of the Notices may be copied by any process (electronic or otherwise) or stored electronically in any form whatsoever.

The Notices may be copied for the purpose of inserting their substance on official charts and other publications. However, any copies of the notices may not be sold for profit.

## Chart Correction

**436 AUSTRALIA — Publications — Miscellaneous new edition to be published shortly.**  
RAN Hydrographic Service. (AH 17/3)

Chart	Title		
Aus 65020C	Index of Fleet Charts		

**437\* AUSTRALIA — NEW SOUTH WALES — Botany Bay — Light beacon.**  
RAN Hydrographic Service. (AH 61/78)

**Aus 198 [388/96]**

Amend	On certain copies only light to Fl. R. 3s	34° 00'.41 S	151° 08'.63 E
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**438\* AUSTRALIA — NEW SOUTH WALES — Port Jackson — Cockatoo Island — Feature.**  
Chart Aus 203. (AH 65/36)

**Aus 200 [389/96]**

Delete	fixed point with legend Siren	33° 50'.83 S	151° 10'.31 E
		33° 51'.06 S	151° 10'.27 E

**Aus 202 [389/96]**

Delete	fixed point with legend Siren 18s	33° 50'.83 S	151° 10'.31 E
	fixed point with legend Siren 9s	33° 51'.06 S	151° 10'.27 E
	legend Ferry Wharf	33° 50'.84 S	151° 10'.31 E
		33° 51'.08 S	151° 10'.24 E

**439\* AUSTRALIA — QUEENSLAND — Delcomyn Island — Islet northwestward.**  
SV *Mirama*. (AH 58/126)

**Aus 248 [97/93]**

Substitute	islet for drying rock	22° 26'.62 S	150° 45'.03 E
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**440\* AUSTRALIA — QUEENSLAND — Cape Cleveland — Light.**

List of Lights Vol K/96 - 3092.10.  
MV *Lady Lorraine*. (AH 58/78)

**Aus 827 [111/96]**

Amend	On certain copies only light to Fl. WR. 7.5 s 210R 15/12M	19° 11'.0 S	147° 00'.9 E
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**441\* AUSTRALIA — QUEENSLAND — Twin Island — Wreck dispersed.**  
HMAS *Mermaid*. The wreck was FV *Nuovo San Giuseppe*. (AH 70/150)

**Aus 376 [420/96]**

Delete	wreck with legend PA	10° 24' S	142° 30' E
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**Aus 428 [281/96]**

Delete	wreck with legend PA	10° 24' S	142° 30' E
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**Aus 839 [362/96]**

Delete	wreck with legend PA	10° 24' S	142° 30' E
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# ADMIRALTY PILOTS

## CORRECTIONS TO ADMIRALTY SAILING DIRECTIONS

NP 51 New Zealand Pilot (1987 Edition) —  
Supplement 4—1995

### Breaksea Sound — Directions and Anchorages

175

L 27-31 *Replace by:*

Mid channel NW of Harbour Islands and John's Islands, thence:  
Mid channel N of a drying rock 1.8 m lying 200 m off the S shore of the fjord.

L 41-45 *Replace by:*

Vancouver Arm should be entered mid channel between Chatham Point and the small islet and 8 m depth close to the NW coast of the Arm; navigation should be maintained mid channel until approaching the small peninsula and drying bank formed by the outflow of a river on the N coast of the fjord (45°30'.2S, 166°58'.5E) some 5 miles into the Arm. The river outflow has resulted (1996) in the narrowing of the navigable channel and shoaling across the fjord. Navigation beyond this area is not recommended for large vessels.

L 49-52 *Replace by:*

Broughton Arm should be navigated keeping closer to the N side until passed the dangerous underwater rock of 2.0 m (45°33'.7S, 166°54'.0E) and the drying rock of 0.8 m (45°33'.2S, 166°58'.3E); thence mid channel to the head of the Arm. Large vessels should turn in approximate position 45°33'.8S, 166°54'.6E prior to exit from the Arm. Shoaling with a drying bank caused by river outflow is found at the head of the Arm.

L 67 *Insert:*

#### Second Cove 5.321a

Second Cove (45°33'.1S, 166°48'.4E), on the N coast of Breaksea Sound, affords anchorage for numerous small craft in NW storms. To reduce swinging room a stern line should be tethered to the NW coast. The head of the cove dries with an extensive mud bank.

R 13 *Replace by:*

(45°34'.5S, 167°00'.2E).

#### 5.323a

A small cove formed by a river with an island on the SW coast close to the entrance to Broughton Arm (45°33'.5S, 166°52'.9E) appears suitable for anchorage at HW; however, drying banks and dangerous underwater rocks make this cove an unsuitable anchorage for all vessels.

### Wet Jacket Arm—Anchorage

176

L 15 *Add:*

In 1996 HMNZS *Tarapunga* found good anchorage here close to the N coast with the stern tethered to the shore.

HMNZS *Takapu* and HMNZS *Tarapunga*

[Ad 31/96]

### Tokomaru Bay — Leading Lights and Dangers

333

R 1-11 *Replace by:*

#### Dangers

##### 9.246

A reef of rocks extends S from Koutunui Point; Hikutu Rock, a rocky patch, the top of which is formed by two isolated rocks awash about 120 m apart.

R 18-20 *Delete*

### Waipiro Bay — Anchorage and Dangers

333

R 66-67 *Replace by:*

...anchor closer inshore avoiding the area of rocks centred on 38°00'.9S, 178°21'.2E and a rock about 2½ cables N and a rock with a least depth in position 38°01'.6S, 178°20'.8E.

### Tolaga Bay — Anchorage

335

L 70-R 29 *Replace by:*

...increases closer inshore; in 1996 HMNZS *Monowai* anchored about 7 cables from the end of, and in line with, the wharf in a depth of 16 m (mud and fine sand) and reported good holding; smaller vessels can anchor closer inshore and fishing vessels often lie close off the end of the wharf.

### Anaura Bay — Dangers

336

L 1 *Replace by:*

#### Dangers

L 3 *Add:*

A number of isolated and drying rocks exist to the N and SW of Motuoro Island;  
Drying rocks and a small reef exist on the N side of Anaura Bay about 3 cables S of the un-named point;  
An isolated rock with a least depth of 0.5 m exists about 2½ cables E of the un-named point.

HMNZS *Monowai*

[Ad 31/96]



# Admiralty List of Radio Signals

CORRECTIONS TO ADMIRALTY LIST OF RADIO SIGNALS	
Edition No 30 dated 30 August 1996	
<p><b>VOLUME 1, 1995/6 — PART 2</b> Published BA Wk 29/95</p> <p>(Last Corrections: Edition No 29 dated 16 August 1995)</p> <p><b>THE 1995/97 EDITION OF THIS VOLUME HAS NOW BEEN PUBLISHED THE 1995/96 EDITION IS CANCELLED</b></p> <p><b>VOLUME 1, 1996/7 — PART 2</b></p> <p>Notices accrued while this volume was in the press will be re-issued in Edition No 31 dated 13 September 1996.</p> <p>Page 071: <b>INMARSAT MARITIME SATELLITE SERVICE, HELP LINE SERVICE</b>, line 5, Delete 0171 ... to ... International), and replace by: 01278 772342 (+44 1278 772342 International). INMARSAT and Fondeuse Radio Ad 31/96</p> <hr/> <p><b>VOLUME 2, 1996</b> Published BA Wk 7/96</p> <p>(Last Corrections: Edition No 28 dated 16 August 1996)</p> <p><b>RADIOBEACONS AND RADIO DIRECTION-FINDING STATIONS</b></p> <p><b>0418 Travemünde Lt</b> Footnote: delete telephone ... to ... 75438, and replace by: telephone +49 (04502) 84750, Fax +49 (04502) 8475527. (German Radio List) Ad 31/96</p> <p><b>3785 Tongey</b> Delete mode of emission A2A and replace by: NON A2A</p> <p><b>3791 Isla Robinson Crusoe</b> Delete mode of emission A2A and replace by: NON A2A</p> <p><b>3800 Punta Anegadiza, Isla Mocha</b> Delete mode of emission A2A and replace by: NON A2A</p> <p><b>3804 Chaitén</b> Delete hours of service HJ and replace by: H24</p> <p><b>3806 Isla San Pedro</b> Delete mode of emission A2A and replace by: NON A2A Delete hours of service 1100-0200 and replace by: H24</p>	
<p><b>3808 Isla Guareño</b> Delete mode of emission A2A and replace by: NON A2A</p> <p><b>3814 QTG SERVICE</b> Delete line 2 and replace by: Note: Transmissions consist of the Station's call sign repeated for 90 seconds. Requests should be made on 500 kHz Ad 30/96 Insert station: <b>Puerto Montt R CBP</b> 41°29'S 72°57'W (Chilean Radio List) Ad 30/96</p> <p><b>4388 Heald Point Lt, Anticosti Island</b> Delete station (Canadian Notice 7/373/96) Ad 30/96</p>	<p><b>RADAR BEACONS</b></p> <p><b>5017 Bridge Lt Buoy</b> Delete station and replace by: <b>Bridge Lt Buoy Racon</b> 50°29'.59N 1°38'.80W 5017 (3 &amp; 10cm) 10 n miles T (Tenny House Notice 20/96) Ad 31/96 Insert station: <b>Irbenskiy Lt Racon</b> 57°45'.02N 21°43'.48E 5773 15s 020°-125° 12 n miles I (Lithuan Notice 12/065/96) Ad 31/96 Insert station in <b>SEA LANKA</b> section: <b>Colombo Approach Lt Buoy 2 Racon</b> 6°58'.30N 79°50'.09E 7952 B (WV Jarvis Bay and P.A.O Containers Ltd) Ad 31/96 <b>8406 Kannon Saki Lt</b> Delete station (Japanese Notice 20/308/96)</p>

## Maritime Safety Information

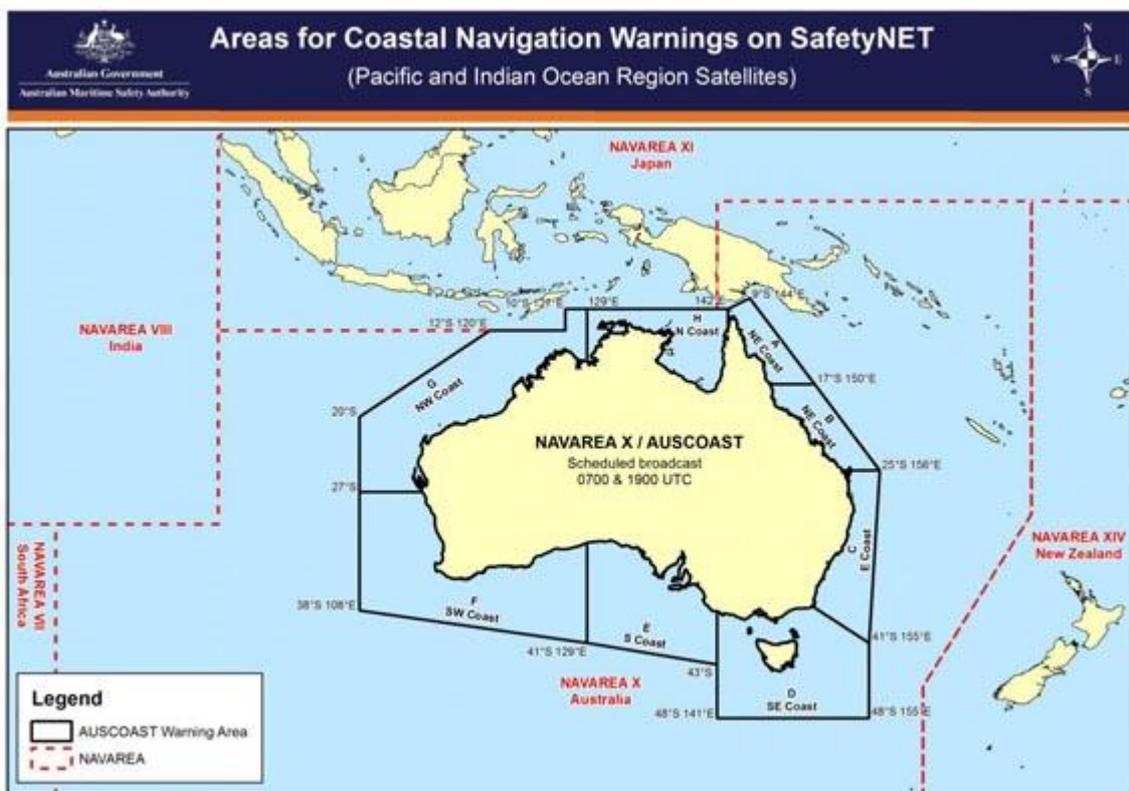
AMSA and the Bureau of Meteorology provide vessels with maritime safety information (MSI) about hazards and foreseeable dangers to safe

navigation through Australia's marine environment. MSI is designed to give mariners information relating to:

- navigation safety warnings
  - meteorological warnings
  - meteorological forecasts relevant to vessels within specified coastal areas
  - search and rescue information
  - other urgent safety related messages.
- Most MSI is temporary, while others may remain relevant for several weeks and superseded by notices to mariners.

In Australia, MSI is provided via long range warnings (NAVAREA X and METAREA X warnings) and coastal warnings (AUSCOAST warnings, sea safety messages, and coastal wind warnings).

AUSCOAST warnings are broadcast to the relevant coastal areas as shown:



The primary method for promulgation of navigational warnings is via the Inmarsat SafetyNET system supplemented by HF radiotelephone broadcasts.

It is the responsibility of masters to ensure their Enhanced Group Call (EGC) and HF receivers are correctly configured, even while in port (if needed), to receive MSI appropriate to their intended voyage.

HF radiotelephone broadcasts are promulgated on the following schedule and frequencies from sites at Wiluna, WA and Charleville, QLD. It is important to test which frequencies and broadcast site (Charleville, QLD or Wiluna, WA) suit your listening requirements for time of day, month and season.

[More at Maritime safety Information.](#)

## **MASTREP**

MASTREP Ship Reporting for the Australian Area

The Modernised Australian Ship Tracking and Reporting System

(MASTREP) as described in Marine Order 63 Vessel

Reporting Systems, effective 1 January 2016, is used to track the location of vessels. Under this system:

- positional reporting for vessels is sourced from the vessel's Automatic Identification System (AIS);
- Sailing Plans, Deviation Reports and Final Reports are not required;
- communications with vessels continue to be available through Inmarsat, HF, satellite telephony and other means;
- Special Reports are required to support AMSA's role in shipping oversight and incident reporting management.

MASTREP is operated by the Australian Maritime Safety Authority (AMSA) as part of the services offered by the Joint

Rescue Coordination Centre (JRCC Australia). JRCC Australia is staffed 24 hours per day

[More about MASTREP at AMSA.](#)

## ***Chart Catalogues***

In Australian waters charts can be identified using 2 catalogue sheets.

Northern sheet covers from Port Clinton in Queensland to N.W. Cape in Western Australia.

Covered on the above sheet is Papua New Guinea and the Solomon Islands.

The Southern sheet covers the rest of Australia including Tasmania.

The sheets give the Chart Number, Title, Scale and Current Edition Date.

On the back of each sheet are various miscellaneous charts and publications.

Their numbers are: Southern AUS 5020B, Northern AUS 5020A

The catalogue charts should not be used for navigation but are invaluable for planning a voyage and ordering charts and publications required.

## **Types of Charts and Information Provided**

A nautical chart is a graphic representation, on a plane surface, of a navigable area on the earth's surface. They are available both as paper charts and as electronic charts. They differ from a map in recording both position and elevations from survey with a reliability statement (zones of confidence). There will be an updating service provided for government charts to maintain their high accuracy. It is an essential tool of the navigator and without it a position cannot be fixed relative to navigation aids, the coastline or hidden dangers.

A chart will show the depth of water by soundings and depth contours, shoreline, topographic features, nature of the bottom, tidal streams, magnetic variation etc. for the area.

## ***Chart categories***

### ***World Charts***

These are the smallest scales and are used to show Ocean Routes, Ocean Currents, Magnetic Variation.

### ***Ocean Charts***

These are the next scale and are typically 1:10,000,000, covering large areas such as the Indian Ocean, North Pacific etc. The shoreline and topography is not shown in great detail. Used for planning and position fixing on long ocean passages.

### ***General Charts***

Used for navigation where courses lie outside outlying reefs and shoals. Typically 1:1,000,000 AUS423 Eddystone Point to Port Jackson.

### ***Coastal Charts***

Used for inshore navigation where courses lie inside outlying reefs and shoals. Typically 1:150,000 AUS701 Vrilya Pt. to Duyfken Pt.

### ***Plan Charts***

Used for harbours and rivers giving great detail. Typically AUS32 Cambridge Gulf 1:75,000 with insets of 1:37,500 Wyndham Approaches

1:7,500 Wyndham Wharf

## ***Chart Information***

Find a chart and identify the following information while reading the text.

## **Chart Number**

The catalogue number of the issuing authority is shown in the lower right and upper left margins.

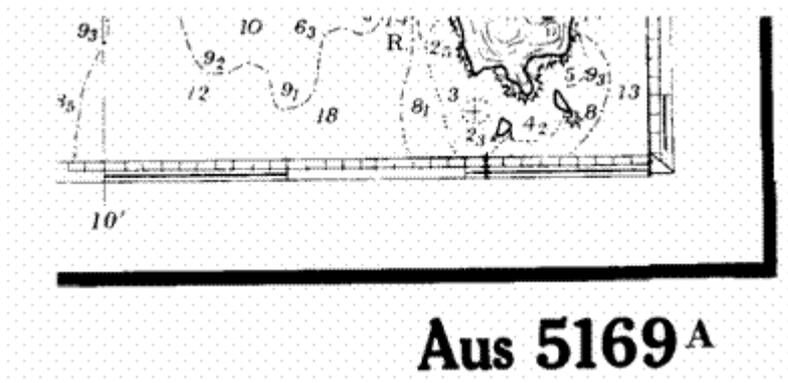
The number will be preceded by letters

Examples being AUS..... Australian

NZ..... New Zealand

B.A..... British Admiralty

INT..... International



*Figure 6: Chart Number*

## Printing Date

PRINTED BY ROYAL AUSTRALIAN SURVEY CORPS 18.9.78

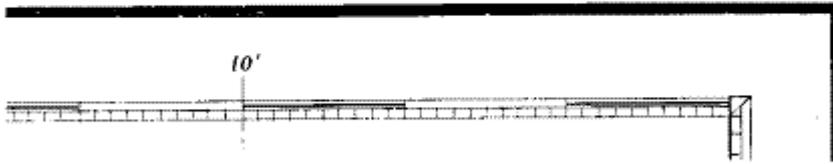


Figure 7: Chart Printing Date

Appears in the upper right margin.

## Dimensions

Appear in brackets in the lower right margin.

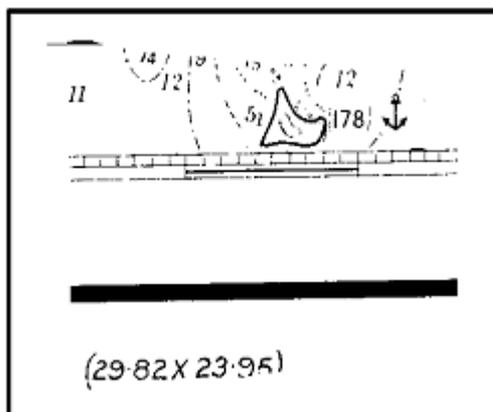


Figure 8 Chart Dimensions

### ***Title or Legend***

This is placed in a position on the chart so that no essential navigational information is obscured often over land areas.

It usually includes.

Area Depicted

Survey Dates

Units of Sounding - Fathoms or Metres

Notes on Heights

Natural Scale

Projection - Mercator, Gnomonic

- Transverse Mercator

Frequently found under the tide, but may appear elsewhere if space so requires in Tidal information and Caution notes.

### ***Publication***

This appears in the centre bottom margin. It may include new edition and large corrections.

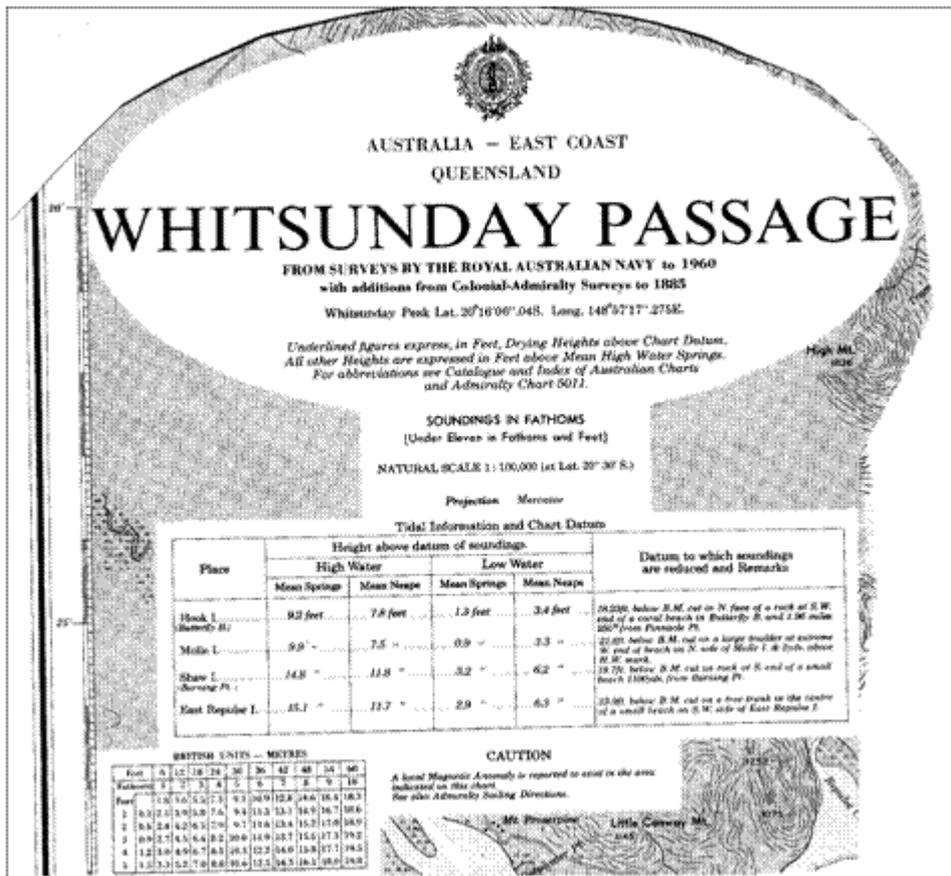


Figure 9: Chart Title and Date of Publishing

### Small Corrections

The year and correction number are placed in the lower left margin as they are entered on the chart from 'Notices to Mariners', a small section of which is shown in Figure 10.

Temporary and provisional notices should only be entered in pencil on the chart and their number **never** entered in the small correction area.



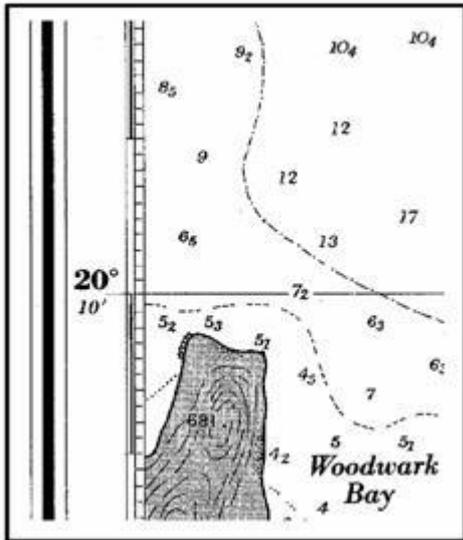


Figure 11: Latitude Scale

The **Longitude** scale is across the top and bottom of the chart and defines the position East or West of Greenwich.

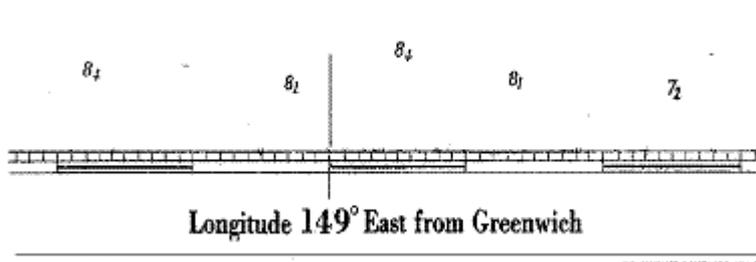


Figure 12: Longitude Scale

To define position by bearing and distance we use the compass rose, Figure 1.13 for true bearing and the Latitude scale, Figure 1.14 for measuring distance.

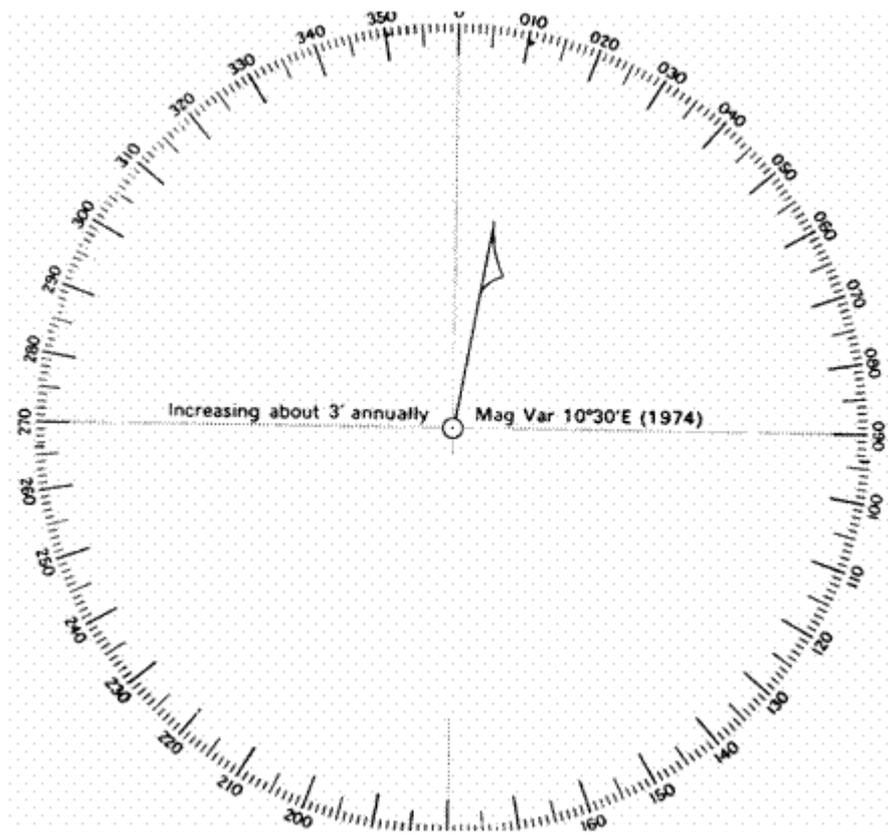


Figure 13: Compass Rose

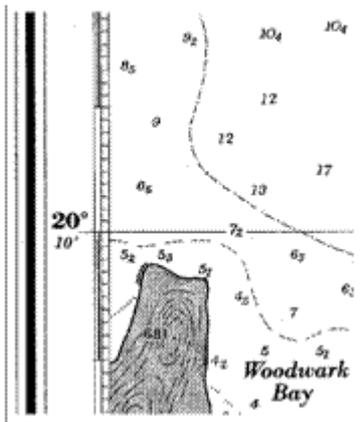


Figure 14: Latitude Scale

## **Symbols and Abbreviations**

All lines and symbols on a chart mean something and are contained in publication (5011 Symbols and Abbreviations). However, certain symbols and abbreviations the student should be able to recognise without reference to 5011.

Notably:

*Rocks*

*Wrecks and Obstructions*

*IALA Buoys and Beacons*

*Light Characteristics*

The more common natural features to your area and certain areas of limitations.

The questions at the end of this outcome give an indication of the type of symbols and abbreviations the student should be able to recognise.

Particular attention should be paid to water depths and nature of the bottom.