The Wartime Notebook of Cadet Rating Edwin Bland,

RNVR officer under training at H.M.S. King Alfred

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Enlisted as Ord. Coder, service number P/JX508522, May 4th 1943

Commissioned

Temporary Acting Sub Lieutenant Royal Naval Volunteer Reserve (Sp.Br.) December 16th 1943

E Bland

'Victory' Ship

R.N. DOCKYARD.

PORTSMOUTH.

Built Chatham 1765.

Tonnage = 2162

Anchors = 56 cwt

Length = 226'

Keel = 151'

Beam = 52½'

104 guns.

Capt = Capt Grant

Lt/Comm = Barber.

Lt = Lacey.

Lt = Thurgood.

1 fathom = 6 feet

12½ fathoms = 1 Shackle

8 Shackles } = 1 Cable length.
100 fathoms } (600 ft)

6080 ft. } = 1 Nautical
10 Cables } Mile

B. Sc. Sk. ←

Anchors & Cables

The cable is secured to the CABLE CLENCH in the cable locker.

From here it is led through the navel pipe on to the deck; led round the cable holder & through the HAWSE PIPE. The anchor when weighted, rests in the hawse pipe — part showing on deck & the crown etc. at the bow end of the hawse pipe.

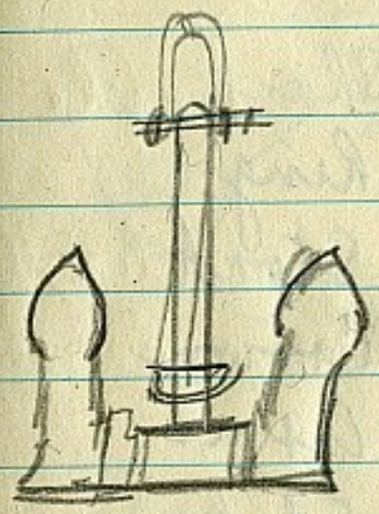
To let go the anchor, unscrew the screw securing slips & Blake slip Stopper & let the cable take the wt. of the anchor.

Then take veer on the cable holder until the anchor is "A'Cock Bill". Apply Blake Stopper until ready for dropping anchor, when the slip is knocked off. The brake has meanwhile been taken off the cable holder & so the cable is free to run out.

Stockless Anchor

is used on most ships. No stock & can be pulled up the hawse pipe & stowed there.

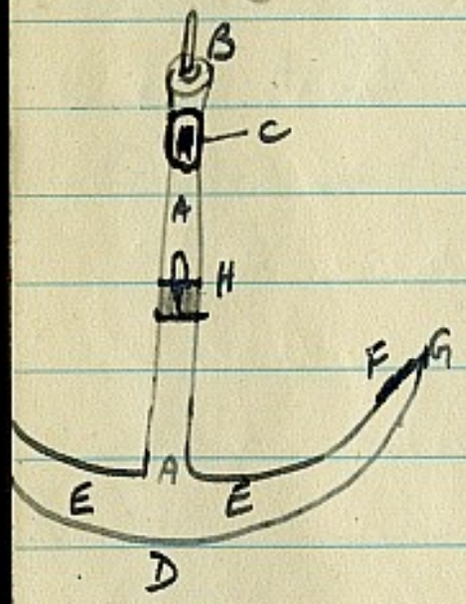
Very similar to the close stowing anchor otherwise.



Used for BOWER
SHEET
STREAM.

Admiralty Patt. Anchor.

for small boats now.
The stock is at rt. ∠ to the crown & thus prevents it from lying on sea-bed without engaging.



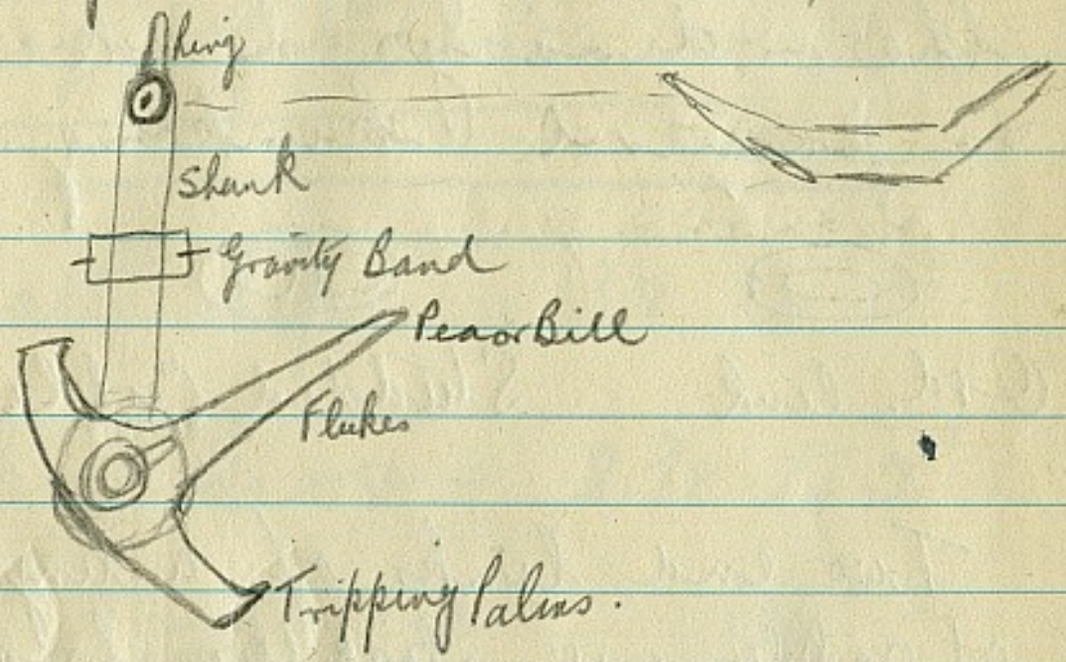
A = Shank
B = Ring
C = Stock
D = Crown
E = Arms
F = Flukes
G = Pea or Bill
H = Gravity Band.

Used for KEDGE anchor BOAT.

Best holding anchor WT, for WT

Close Stowing Anchor.

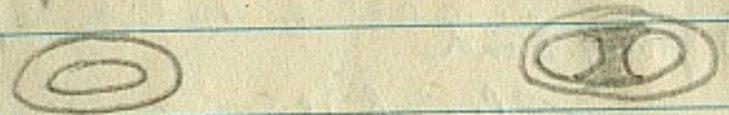
Stock & arms on one plane.
Arms pivots about a socket in the crown.



Going out of use now.

(3 3/8 - 7/16)

Cable Studded links are used always today. They are stronger than the ordinary link & prevent kinking.



Ord. link Studded Cable.

Two end links of a length of cable are slightly larger than the ordy links.

At the beginning of each shackle, a piece of wire is wrapped round 2 studded links to indicate the length paid out. The first shackle is marked on the first link after the end link, The second one

is marked on the second link before after the end link & so on.

Size of Cable.

Battleships = 3 1/4 to 3".

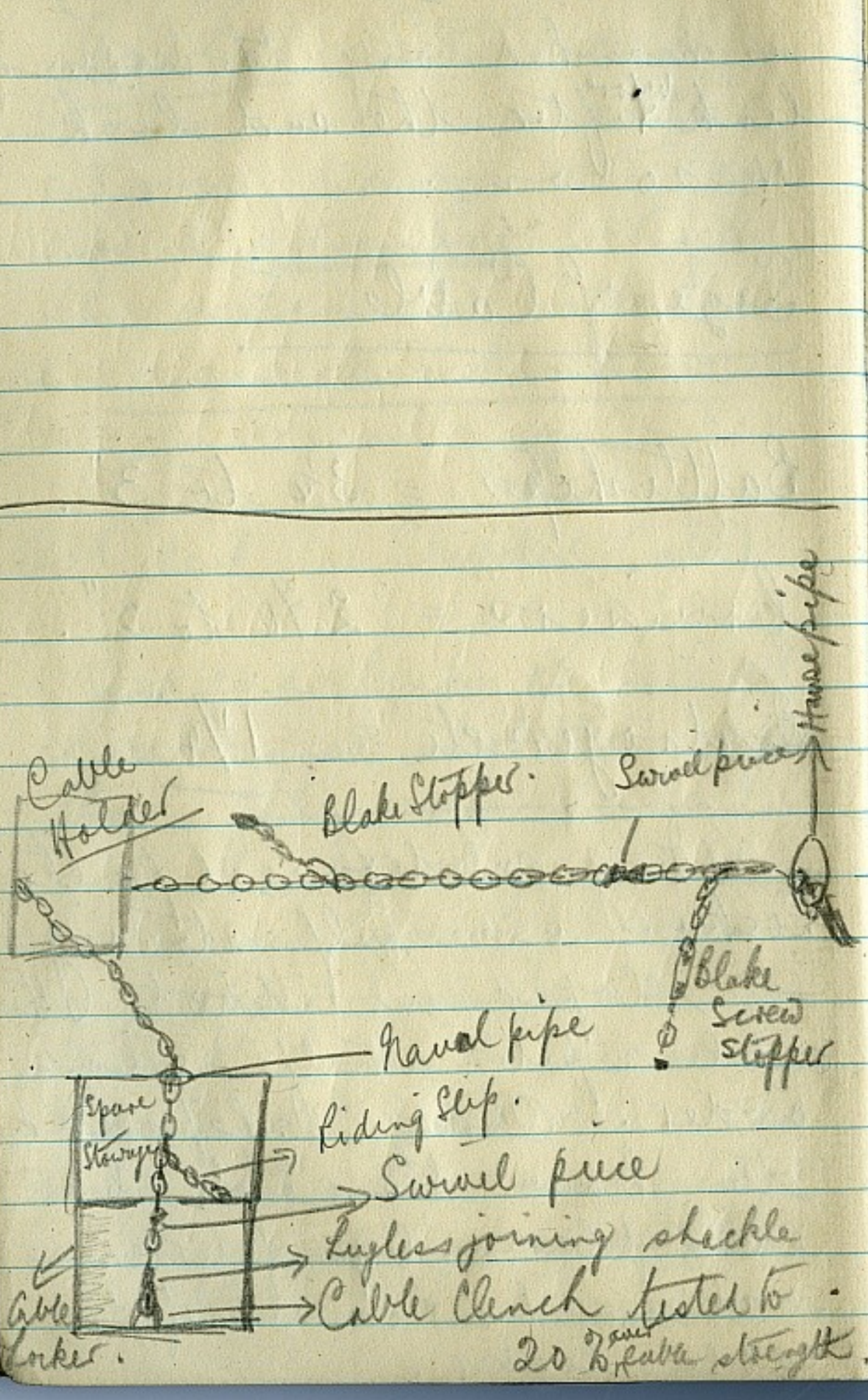
Cruisers = 2 7/8 to 2".

Destroyers etc. = 1 1/4"

In modern ships the lockers are self stowing — sloped so that the cable piles itself in order. Older ships had to have the cable led into place by four men — at each corner of the cable locker.

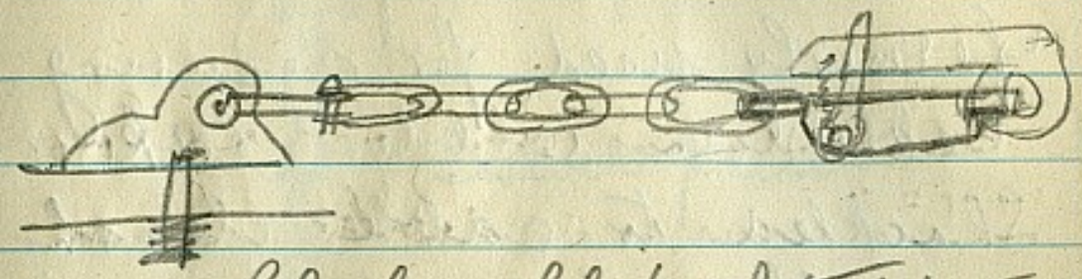
Present on forecastle for anchor work :-

Cable officer
Cable party.
Shipwright (Cable-holders)
Ch Stoker (Winches ~~&c~~)
Blacksmith + Mate. (To 'slip' etc).
Signalman
Phone No.



Fittings used in Anchor Work

Blake Slip Stopper — a chain slip stopper, hackled to a bolt in the deck; used for temp. holding the cable.



Blake Slip Stopper.

Blake SCREW Stopper — is a Blake stopper with a bottlescrew. Used for heaving in & securing stockless anchors close into the hawse pipes.

Riding Slip — This is a Blake Slip fitted below the navel pipe & used as a preventer when the ship is riding by the brake of the cable holder.

Senhouse Slip - now out of date, but formerly used for securing cable in cable locker. Shackled to cable clench at other end is a swivel piece & a slip, which is fastened to the inboard end of the cable

Joining Shackle Used for joining the shackles (or lengths) of cables together.

Hartford Shackle is used to secure cables of 1 7/8" & below, to buoys.

1 shackle = 12½ fathoms (75 feet)

"Cables length" = 8 shackles
↑ i.e. 100 fathoms or 600 feet

Above is a term, but the average length of a ships' main cable is 12 Shackles [or 150 fathoms]

"Stand by to weigh anchor"

Orders for weighing Anchor

Connect up Capstan & cable holder

Off Brake. (~~[illegible]~~)

Off Blake. Slip & R Slip (engine spec. of Shackle or lock)

Heave in — Report comes

anchor upright — up & down.

Clear of bottom = Anchor aweigh

Clear of water = "Clear" of "Foul" anchor

Just below hawse pipe = a cock bill

Avast heaving. (On blake Slip. On Riding Slip.)

Then (Heave anchor home)

On compressor ← On bottle screw slip.

On brake & disconect engine

Screw up bottle screw.

Lash cable.

Orders for letting go Anchor

Clear away. (coves lashings etc)

Connect up ~~Capstan~~ (or cable holder)

~~Off contr. gear~~ (& heave in slightly)

off bottle screw.

off Blake slip.

Veer (until anchor is A Cock Bill)

On Blake slip Off brake Disconnect

Letting go! —

Stand by to slip.

Let go. ~~Slip~~! (Knock slip off.)

When amount of cable has been paid out (cable officer notes length)

On Blake Slip & Riding Slip & brakes cable holder.

ON ~~Off~~ brake.

~~Disconnect~~

Main Principles

① ~~Anchor~~ Cable must never pile up on anchor

② Cable must pull on the bottom

③ Strain of the cable must be taken on a slip, before the slack on deck can be safely handled

④ When riding to anchor, cable must be secured to bitts or cable holder — NOT capstan, or just held by the slip

⑤ Cable must not be subjected to sudden jerks or to sharp bends.

Anchors carried —

Battleship 2·E Class

With			Placed
Cable	2	Bower (Stockless)	P. & St.
Hawse.	1	Sheet "	Spare Starboard Hawse pipe or on main deck waist
~~Cable~~	1	Stream "	Stern
With.	2	Kedge (Admty Patt 1-16, 1-12 cwt).	
	1	For each boat (A. Patt). — in fore sheets	

Cruiser

2 Bower
1 Sheet
2 Kedge
1 each boat.

Destroyer.

2 Bower
(some) → 1 Kedge
1 each boat.

KNOTS - BENDS

Type.

TIMBER HITCH ——

CLOVE HITCH ——

ROLLING HITCH ——

ROUND TURN & TWO HALF HITCHES

FISHERMANS BEND —

CARRICK BEND ——

SHEET BEND —

HITCHES.

Used for :-

Securing end of a rope to a spar, case or light bole

Used when a rope has to be secured to a larger one eg. SECURING RATLINES to the SHROUDS.

Securing HAMMOCKS to the GANTLINES.

Securing HANSER to the ring of a BUOY.

Bending HAWSER to the ring of an ANCHOR. or ROPE to a bucket.

Bending TWO HAWSERS together, when required to go round a capstan.

Securing LAZY PAINTERS to Jacobs ladders of the lower booms.

Bends & Hitches (cont).

Type	Used for:-
BOWLINE	① Round a mans body, when over ships side ② Bending two HAWSERS NOT required to work round a capstan. ③ Putting temporary eye in hawser or rope.
RUNNING BOWLINE	Whenever a running noose is required
BOWLINE ON THE BIGHT	Lowering a man from aloft or slinging him over ships side.
FIGURE OF EIGHT ——	Putting on end of rope, to prevent unreeving.
SHEEP SHANK ————	Shortening a rope temporarily.
CATSPAW ——	Making a temporary hook for hooking on the block of a tackle.

Bends & Hitches (cont).

MARLING HITCH —

MARLINE SPIKE HITCH —

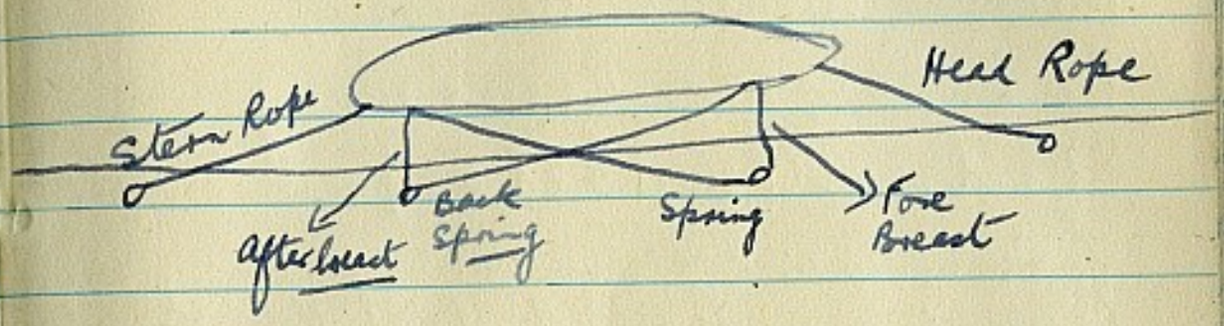
Reef Knot

Used for :-

lashing up hammocks
seizing two ropes or spars.

Heaving the turns of a seizing taut with a marline spike.
Hooking the hook of a tackle to a rope where a small pull is req.

Coming alongside



Head Rope first
Stern Rope second

Orders for lowering boat:—

~~Slip the~~ ~~Cut~~ ~~Haul~~ Gripes.
~~Haul boat out.~~

Turns for lowering.
Start the Falls!
Lower away.
Avast lowering (when just above the water)
Out pins.
Slip. (When crest of wave will take boat as it falls — Slip Robinsons disengaging gear.)

Orders for hoisting boat

Hook on
[Falls are hooked on.]
Haul taut singly
~~Take turns & stop cock.~~

Marry!
Hoist away — — Walk!
High enough.
Separate the Falls.
Hoist away on single fall (if req).
~~Pass the life lines.~~
Ease to the life lines!
Light to.

Turn up. (round cleats.)
Off life lines.
Turn boat in.
On gripes.
Secure boat.

BOATS.

① CLINKER BUILT — Planks of one plank laps over the used for the smaller pulling run fore & aft. Lower part upper edge of the next. boats e.g. Whaler (6 men) Cutter (12 men)

② CARVEL BUILT — Inside the keel, upper ends lying planking worked at 45° to AFT. Edges are all worked flush. Used in gigs & power boats.

③ DIAGONAL BUILT — Similar to last, but BOTH planks(skins) are worked at 45° to keel — in opposite directions. Inner thickness has gunwale ends falling aft. Sailing pinnaces & launches.

Chief Parts of a boat :-

Keel = Backbone - lowest part of boat.
Stem = Fore part of boat
Stern = After end of boat.
Hog = Secured to inside of keel, fore & aft.
Deadwood = Oak, worked into fore and after end of hog, strengthening junctions of stem + stern post with keel.
Gunwale = Runs round inside of boat, at top.
Stringers = Run fore + aft, half way down sides, to take thwarts
Thwarts = Benches, on which oarsmen sit.
Timbers = Transverse frames
Planks = Fore to aft outer coverings.
Stretchers = Wood laid athwart the bottom against which oarsmen place feet.
Knees = Used to secure thwarts to sides of boat.
Rowlocks = Spaces cut in washstrake, to work oars in.
Crutches = Substitute for rowlocks, in single banked boats.

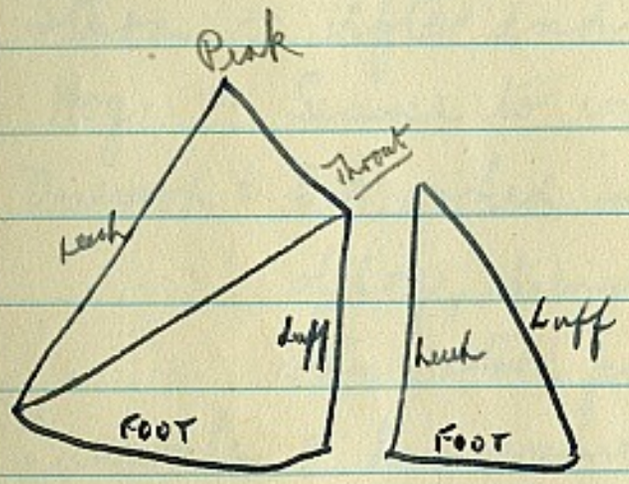
Sailing boats

Cutter (Double banked)

de Horsey Rig.

34 ft × 32 ft.

Sails



GAFFSAIL STAYSAIL

N.B. Luff is next to Mast.
Two sails only, though longer than Whaler.

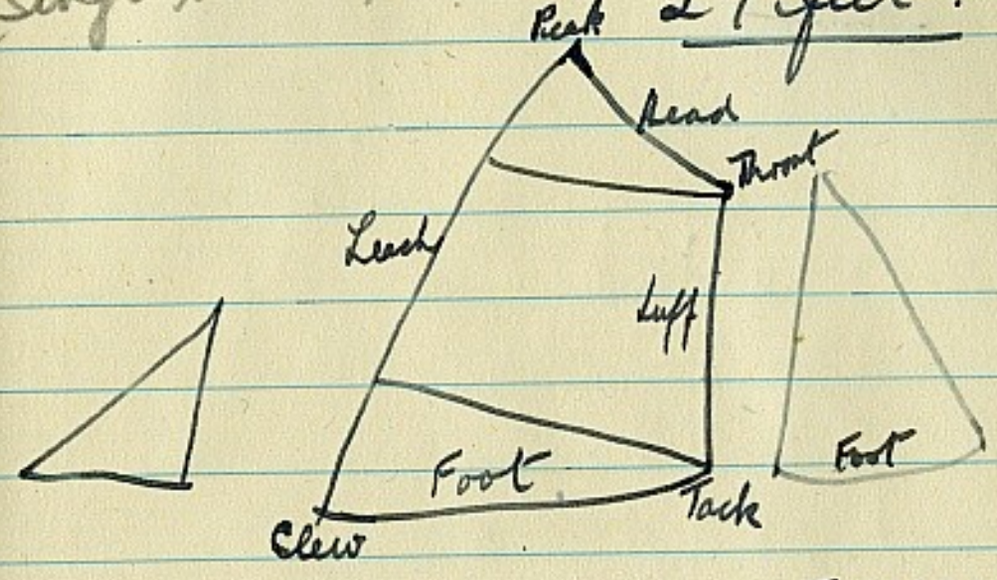
Crew = 12 men & 1 coxwain

Carrying Capac for life saving = 60.

Whaler (Single banked)

Montague Rig

27 feet.



MIZZEN MAINSAIL FORESAIL

Crew = 5 + 1 coxwain.

Carrying capacity for life saving = 27.

Blocks & Purchases

Chief parts of a block :-

Shell = Outside case.
Sheave = Wheel on which rope travels
Pin = Passes through centre of shell & sometimes has bush, for sheave to run on.
Score = Groove on outside, to take the strop (wire rope).
Crown = TOP OF BLOCK
Tail = BOTTOM OF BLOCK.
Swallow = Open part between sheave & shell.

To measure a block, take distance from crown to tail.

Types of Blocks

Common :- Takes rope $\frac{1}{3}$rd its size

Clumps :- Takes rope $\frac{1}{2}$ its size

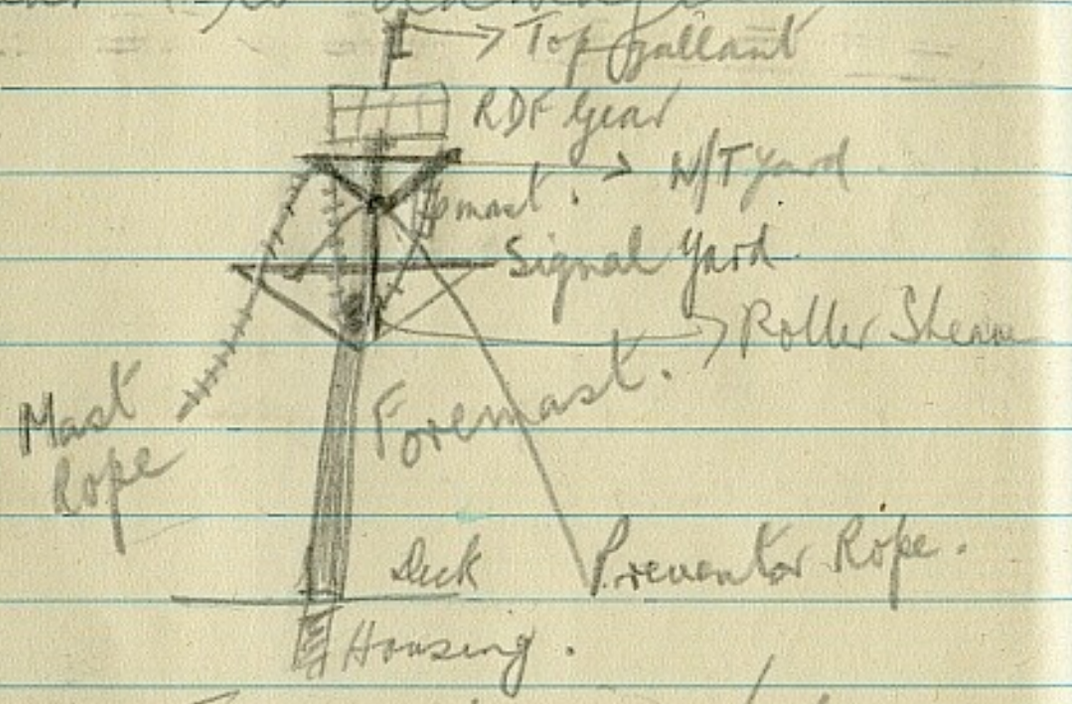
Internal Iron-bound :- These are built with an iron strop inside the shell. Much stronger. Shell can be replaced if broken.

Snatch blocks :- Hinge on one side to allow the rope to be lifted in, instead of being reeved through.

PURCHASES:—

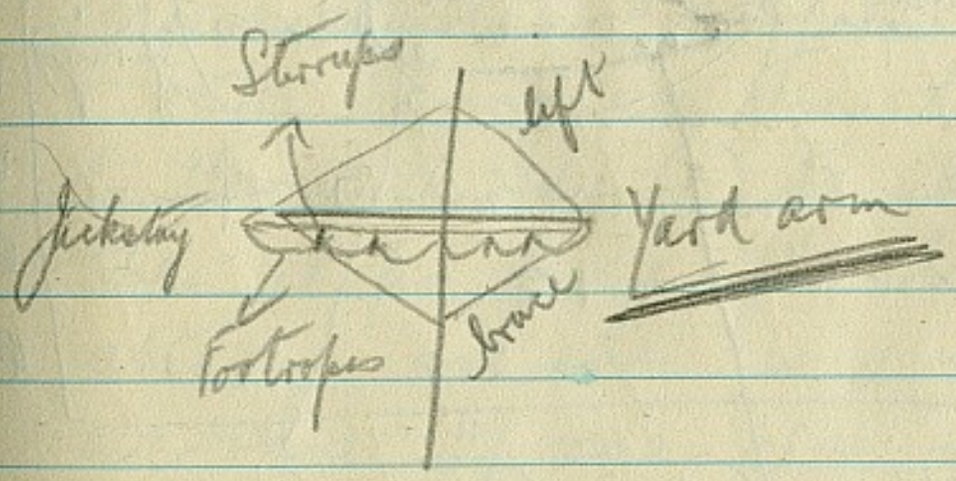
Striking Topmast

Must be done to go under a bridge, or when RDF gear is damaged.



Top mast is held to Foremast in a ratchet arrangement, by means of a pawl & "fid" (wooden wedge).

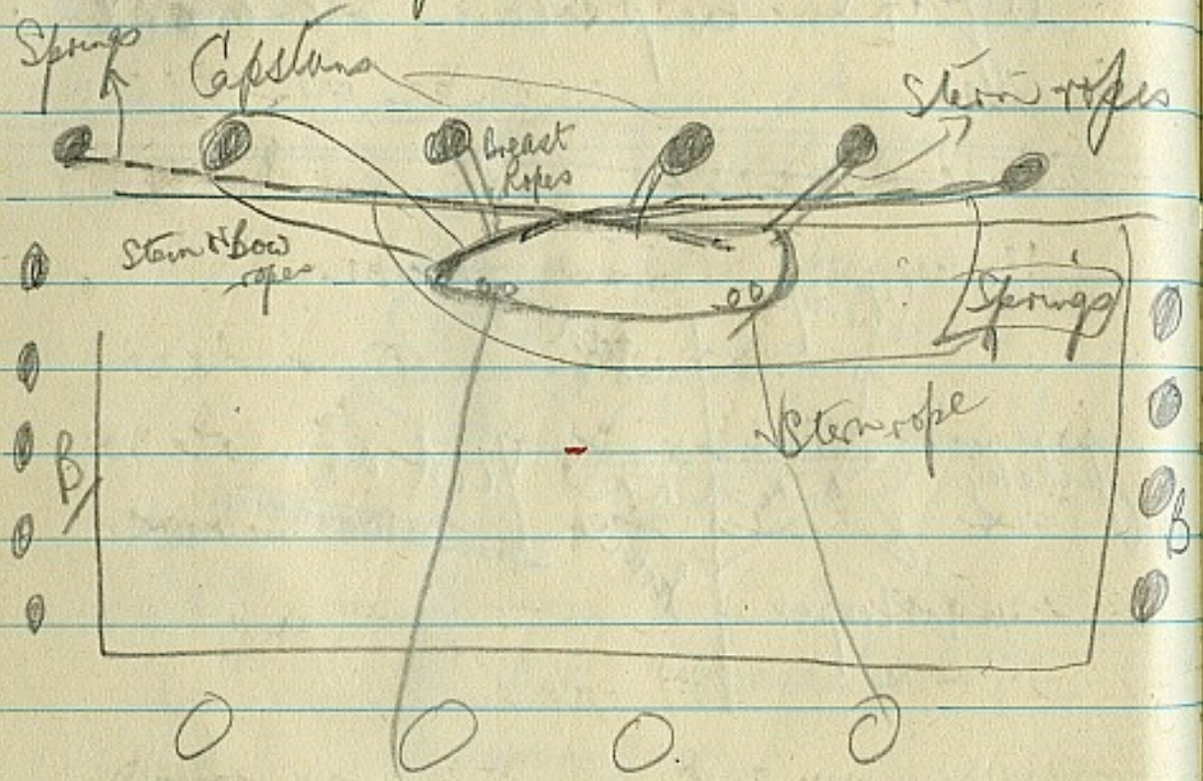
Weight is taken by the capstan or winch preparatory to striking topmast. The fid is then knocked out which leaves the topmast held by the mast rope & preventer rope (forerafft). The mast rope is lowered by the capstan or winch.



Yardarm, centre part = Bunt
outboard ends = Yard
& in between = Quarters.

It is fastened to the top gallant (around the bunt) by a lashing of rope — called PARREL lashing.

Warping is moving a ship by means of hawsers.



"Springs" cross one another & stop the ship going fore & aft. They are the last hawsers to be let go when leaving a jetty.

To move across a jetty as opposite first take the stern & stern ropes to the opposite capstans. The ship is pulled across by making these capstans revolve.

The springs are then tied to the bollards (B) to keep the ships fore & aft line steady as she is drawn across. If one side is open, one set of springs are used on the bollards on the closed side. The stem of the ship is then controlled from a capstan or bollard on the side from which the ship is mooring – it is paid out as the ship goes across.

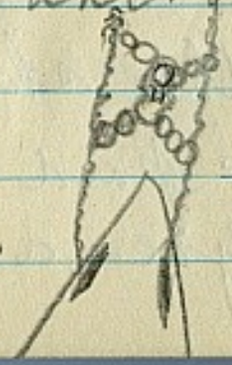
Mooring.

A ship is moored when she has 2 anchors down.

Advantages over single anchor are that the ship does not move about as much & also (in bad weather) greater security.

If the ship swings round when moored, they would cause "foul-hawse" unless precautions taken.

A mooring swivel is used to keep the port & starboard bower anchor cables separated.



VERY LITTLE USED IN WAR TIME.

If a sheet anchor has to be used in addition to the bower anchors, it has to be let go on a large sized wire hawser — no cable is provided. It is held by a carpenters stopper or "Bullwants steel wire nippers".

Depth Recording

① Hand lead line" —

Used when entering harbour etc.

Lead = 10 + 14 ~~lb~~

Line = 1⅛" white hemp
25 fathoms.

Secured to lead by a Raw-hide Becket through the lead & a long eye splice in the rope.

Lead is "armed" in the bottom with soft soap or tallow to find the nature of the bottom.

Marked as follows

2 fathoms = 2 pieces leather
3 " = 3
5 " = White bunting
7 " = Red "
10 " = Red leather with hole
13 " = Blue bunting
15 " = White "
17 " = Red "
20 " = 2 Knots on a piece of line

Soundings between above = "Deeps"
⑫ 1-4-6-8-9-11-12-14-16-18-19.

Distance between lead = Scope & Land.

Distance from chains = Drift to surface of water.
"By the Mark 10"
or. "Deep 6"

(2) Boats lead line :-

Lead = 7 ℔

Line = 2½ ℔ per 20 faths

10 - 12 fathoms

Marked in feet up to 3 or 4 faltoms after which it is marked as the hand lead.

Lead = Leg of mutton shape.

(3) Kelvin S. machine

Drum holding 300 faltoms of 7 strand wire fitted on a spindle.

Spindle is free to rotate unless held by brake checks

Weight of lead = 24 ℔

9 feet of hemp between eye of the shank & end of the wire.

(3) Kelvin Sounding Machine (cont)

Speeds

This is recorded by logs — chiefly

CHERNIKEEF
PITOMETER.

They are usually situated under the Bridge & tubes are led through a valve into the water. The faster the speed, the more pressure up the tubes. These then indicate on the recorder the knots done at this pressure.

Repeats can be placed all over the ship.

Chernikeef has 1 tube, with a rotator which turns as the pressure of the water up the tube increases

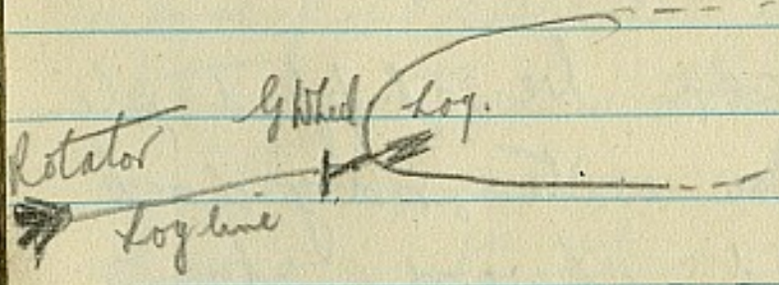
Pitometer has 2 tubes.

Tubes can be shipped when in shallow water or dry dock — turned upward by a small winch.

Logs (cont)

NEPTUNE } are all
CHERUB
* TRIDENT } placed astern

These carry log lines (plaited) varying in length from 40 – 120 fathoms. A Rotator at the end turns round as the ship goes through the water – the speed is passed to the governor wheel & then indicated by the machine.



These are not so accurate as the Chernikeef or Pitometer.

(Cherub is going out of use)

Rigging

STANDING

Stays for masts
Shrouds
Funnel stays.

= Steel Wire Rope (1½-3½")
Wire Heart to each strand.
Hemp Heart to the rope

RUNNING.

= Hawsers etc.

(= Flexible Steel Wire Rope
4½" & under

Each strand has Jute heart.
Rope has Hemp heart.

---

or Extra Spec F.S.W. Rope.

Steel heart, but more strands
Round a hemp heart.

Special Wires :-

= Paravane Wire
Sounding Wire 7 strands
Kite "
Oropesa "
Calpeer "
E.S.F.S.W.R (TINNED) (Boats falls)

The last one is tinned to prevent friction when running.

Rope Used in Navy

Hemp (White & Tarred).
Tar preserves but weakens.
Manilla. - Hawsers, tackles, general.
Sisal - Use when safety not imp.

Grass (or Coir) - floats, used for collision mats, + heaving lines.

Boltrope (Italian Hemp) Roping sails, awnings

Rope

Cord Ropes are measured by their CIRCUMFERENCE — not the dia, as with steel wire.

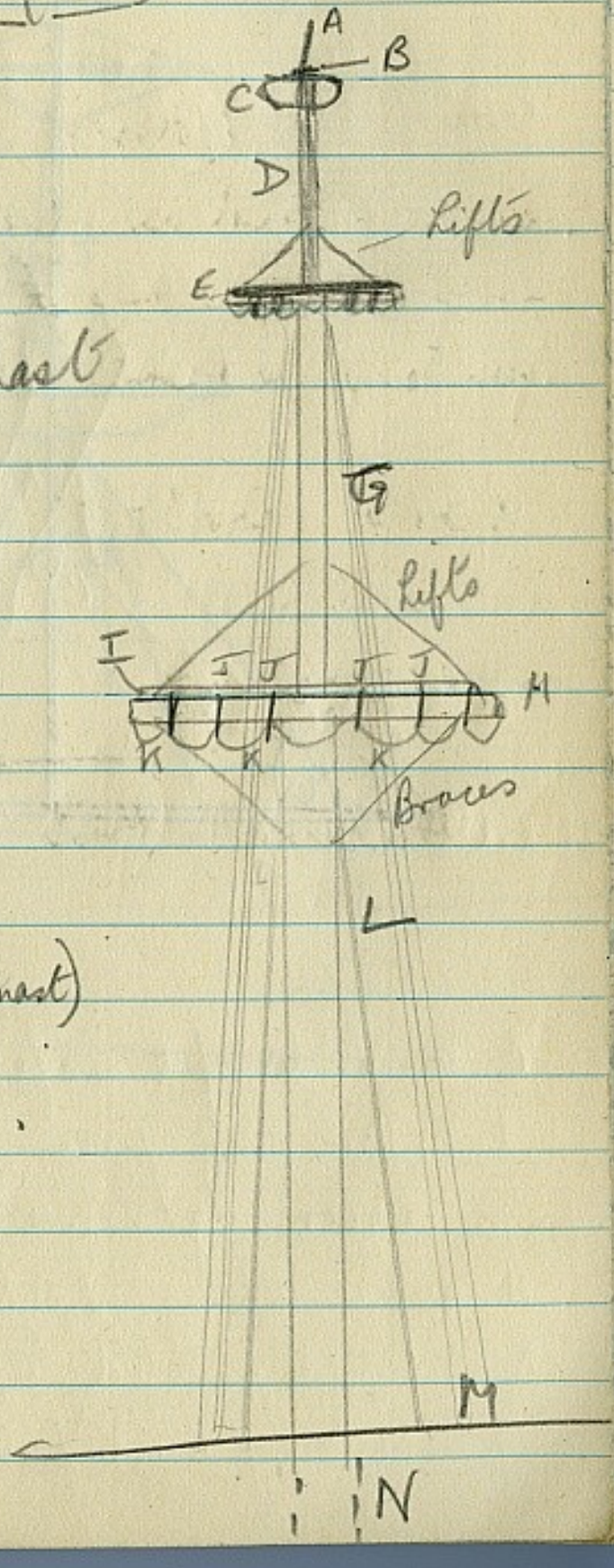
Used for:—

Berthing wires.
Signal halliards
Cutting P'd'k.
Mooring P'd'k.
Picking up Rope
Gangers
Slip Rope
Guard rails.

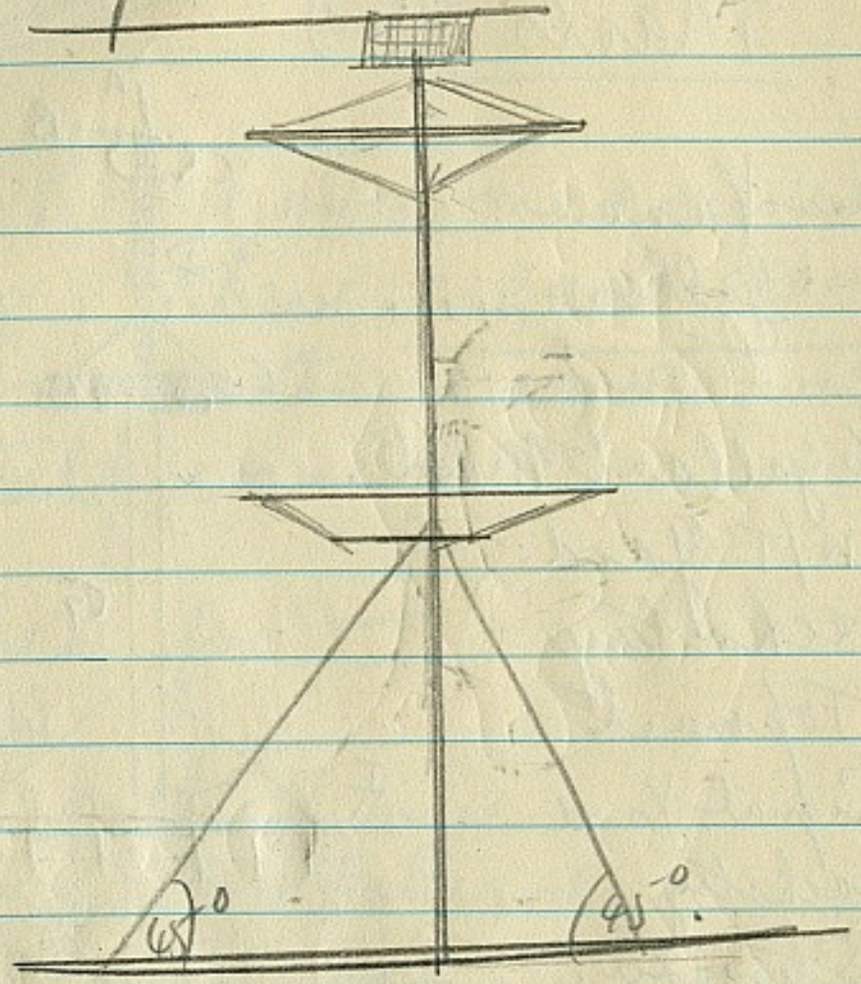
Cruisers

Masts (Wood).

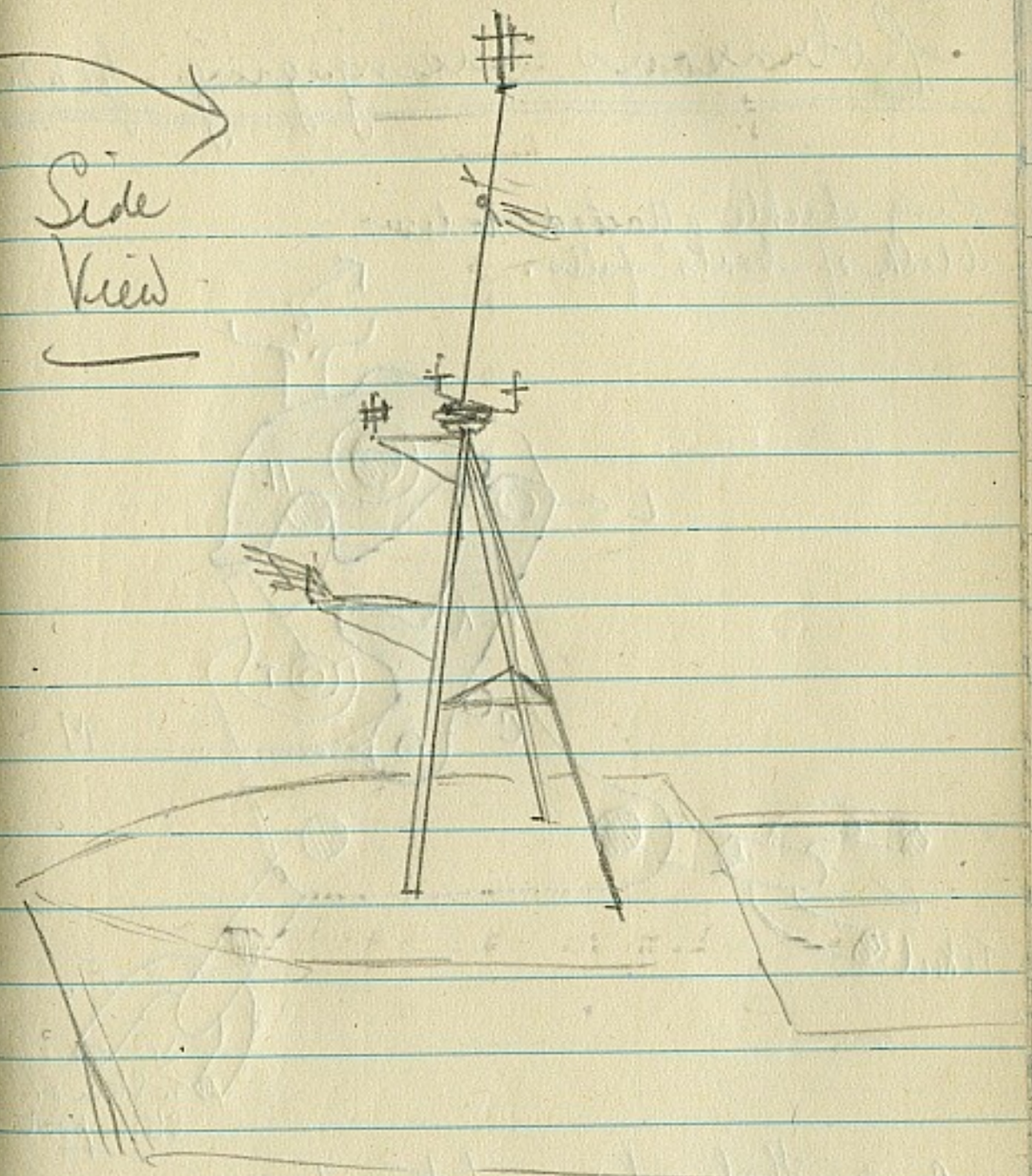
A Vane
B Gallows
C Truck
D Topgallant Mast
E W/T Yard
F Jackstay
G Topmast
H Signal Yard
I Jackstay
J. Stirrups
K Footropes
L Mainmast (or Foremast)
M = Deck.
N = Housing.



Tripod Mast (Steel)

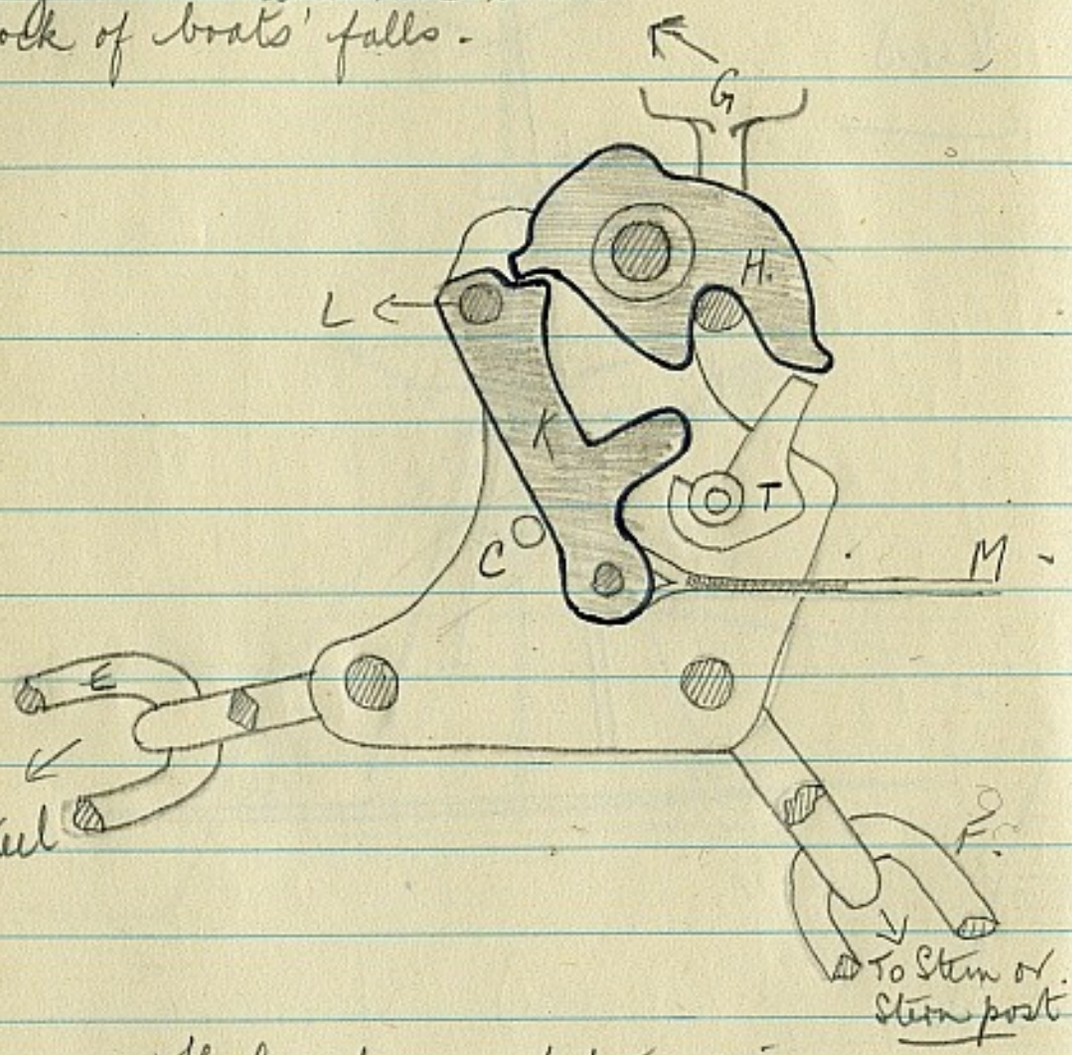


Side View



Robinson's Disengaging Gear.

Ring shackle attached to lower block of boats' falls.



C = Hole for safety-pin.

T = Mousing piece for preventing G. from becoming accidentally unhooked.

H = Tumbling-hook.

K = Lever pivoted upon bolt L, & held in position by direct pull of the wire pendant M

Fleet movements :—

TOR = Order pendant.

This is used with the numeral flags 1–6, either superior or inferior.

It indicates whether the ships or columns are formed or disposed to port or starboard.

(1 FLAG)
Inferior = Ships formed to STAR
(or) Columns disposed to STAR

1 FLAG
Superior = Ships formed to PORT
(or) Columns disposed to PORT.

Formation is the arrangement of SHIPS in column, with ref. to each other.

Disposition is the arrangement of COLUMNS in relation to each other.

Following table is used :—

TOR	Line ahead	Line abreast
Column	1	4
Divisions	2	5
Sub-divisions	3	6.

P.T.O., for use of above.

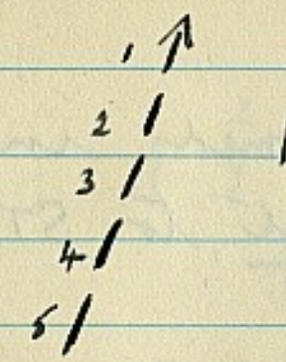
Column
⌈OR 1 = ~~Ships~~ formed in line ahead
no 1 ship leading, followed by 2, 3, 4 etc

Column
1⌈OR = ~~Ships~~ formed in line ahead,
in reverse sequence of Fleet
Nos. i.e. 98765432 1 (nine leading)

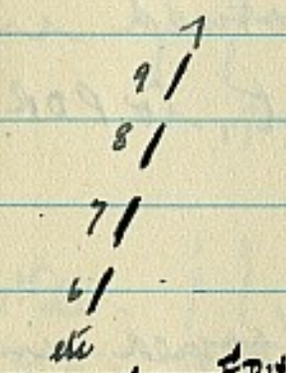
⌈OR 2 = Division formed in line
ahead, columns disposed
abeam to STARBOARD.

2⌈OR = Division formed in line ahead,
columns disposed abeam
to PORT.

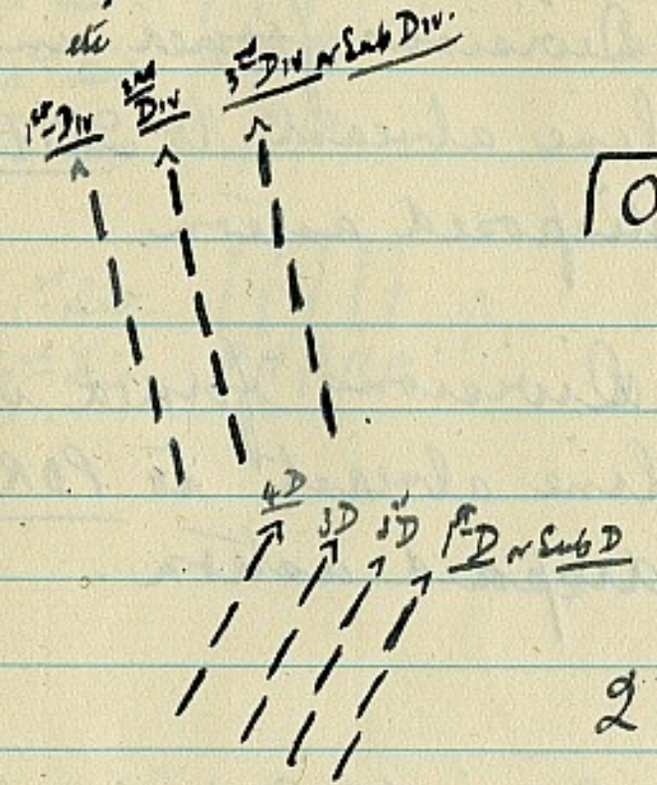
⌈OR 3 = As for divisions, but
3⌈OR in this case read
sub divisions.



⌈OR 1



1⌈OR



⌈OR 2 or 3.

2⌈OR

P.T.O.

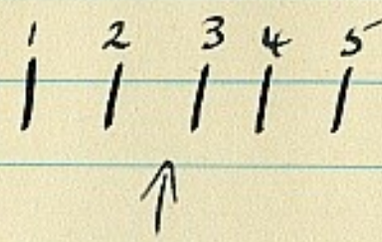
$\sqrt{OR}$ 4 = Column formed in line abreast, to STAR.

4$\sqrt{OR}$ = Column formed in line abreast, to PORT.

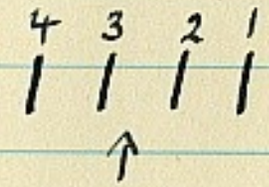
$\sqrt{OR}$ 5 = Divisions formed in line abreast to STAR, disposed astern

5$\sqrt{OR}$ = Divisions formed in line abreast to PORT, disposed astern.

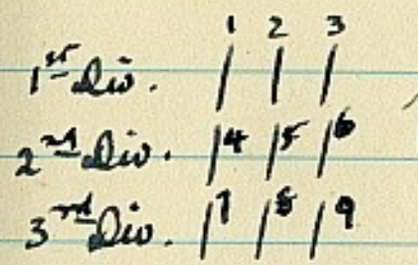
$\sqrt{OR}$ 6 = Substitute Sub. division
6$\sqrt{OR}$ for division, in above.



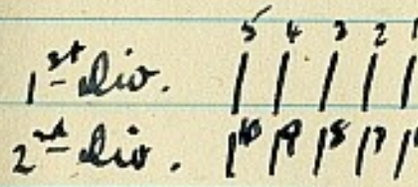
$\sqrt{OR}$ 4



4$\sqrt{OR}$



$\sqrt{OR}$ 5



5$\sqrt{OR}$

As above.

Screening Smokes.

Materials used are:-

① Oil Fuel.
② Zinc Mixt.
③ Chlorosulphonic Acid (CSA)
④ Titaniumtetrachloride (FM)
⑤ White Phosphorous.

Requirements of a smoke screen agent are as follows:-
Must produce a good, thick cloud - preferably white.
Must not deteriorate in storing.
Must be reasonably safe to carry & easy to use.
Apparatus should be easy to control.
Best if can be used without heat.
Easy to obtain in bulk.

Oil Fuel:- Majority of modern ships have spec. lead from oil fuelling pipe which produces the smoke. It must be turned off every 10 mins, to prevent fire.

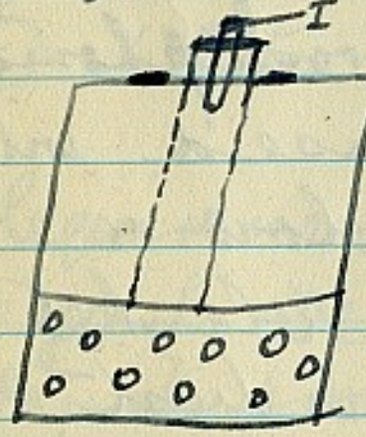
In hot climate it rises & is useless for covering. So Chlorosulphonic Acid would be used with it & this keeps low & makes a complete blanket.

A misty day is best for oil smoke screen, with wind no more than 10-15 knots.

Zinc Mixt:- ⓐ Berger (F)
ⓑ Hexachloroethane (R)

Used in all smoke floats, types F & R.

Smoke float Mark VI is used at sea. Supplied filled with F & R.
Consists of bouyancy chamber with perforated bottom, acting as stabiliser.
Contains 100 lbs of F mixture.
Float = 50 - empty.



Insert no 9 igniter (I) in top. Unscrew cap from same & with match-box type striker, rub across the top of the igniter.

Wait 1 min. and 'pop' will be heard. Igniter will get white hot & is shot into air, as mixt. becomes ignited. Blue flame appears in the opening & float is then pushed overboard.

Two flooding holes allow water to enter chamber slowly. Four discs are blown off top of chamber & smoke belches forth for 8 mins.

Float gives a cloud 500 yds long x 2-300 ft high.

The float itself will then sink in about half an hour.

With R mixture, container holds 70 lbs only: A copper combust. rod goes through container to assist, as R is a slower burner.

Smokes 300 yds long for 2-300 ft high & burns 10-13 mins.

9 lb Smoke Float is used by commandos etc. & works on the same principle as the larger one. Replace lid after the striker has been rubbed & throw in sea. Burns for 5 minutes.

4" Mortar V.L. Mark I. Two sections - float & container. R. mixt or Fmit used again & float is made of wood. This can be dispensed with on land.

Fired by .303 blank at 600 yards max. range. Burns for only 2 mins., but gives a good smoke for short operations.

(3) Chlorosulphonic Acid - Man who works this must wear sea boots, oilskin, gloves, goggles & sou'wester.

container is on the Quarter deck & holds 1400 lb of C.S.A. Three fixed rods 2 to either quarter & one dead astern. A high pres. air system & a reducer valve serve to bring pres. of 100 lb per square inch to bear on C.S.A. This is sprayed outboard in 20 mins As it strikes the atmosphere it makes a bluish - white smoke. At 30 knots, this would give a screen of 10 miles, & it clings to surface.

Antidotes if { Personal - bi carb. on soda splashed { Deck - soda water.

After use, strip down the valves, wash out valves etc. & replace container, or refil.

Type A. container for CSA contains 200 lbs + is used for M.T. Bo.

Forced out by air from air pressure bottle alongside container.

Tubes run up ensign staff or mast & then outs off at angle of 75°.

There is one jet only & the container is used in 7½ mins – say 5 miles @ 40 knots.

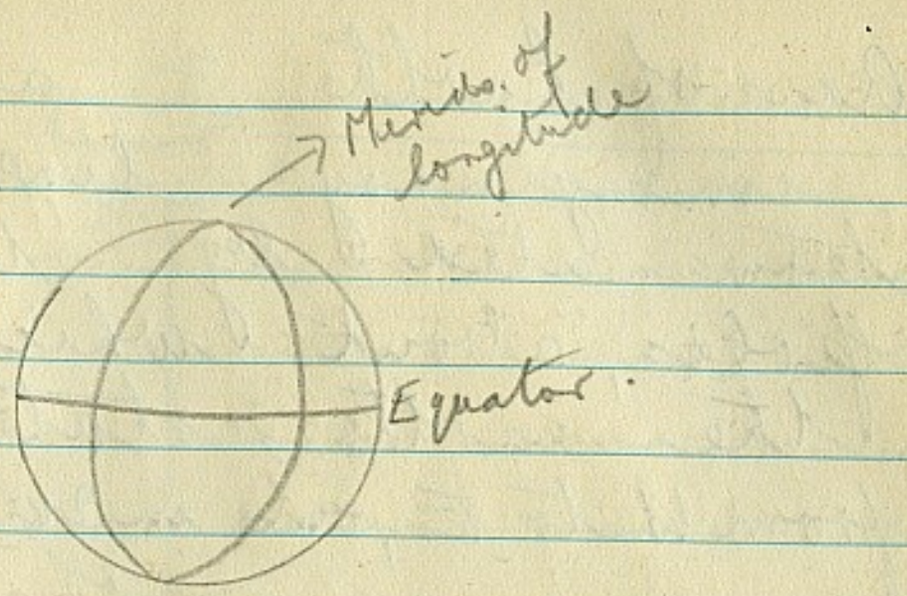
Low pressure type is used for slow speed craft & drum which comes with supply of acid is used.

Air pressure is supplied by ordy. garage foot pump. A pressure of 30 # per □1" is needed to force it out. There are two 6 # jets.

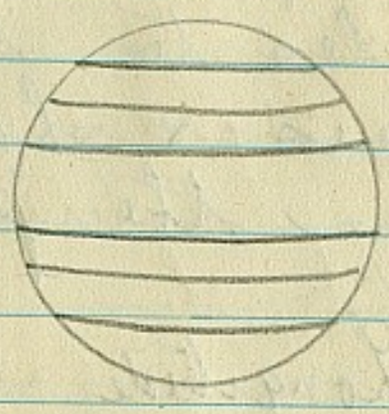
NAVIGATION.

Great Circles :- those whose planes pass through the centre of the earth — i.e. ALL meridians of longitude & the equator.

The shortest distance between any two points on the Earths surface is along a great circle.

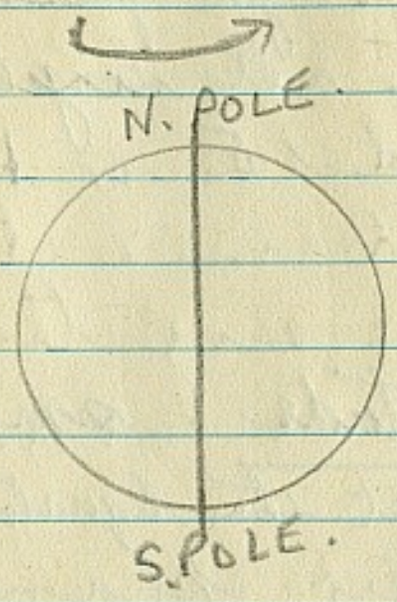


Small Circles :- those whose planes do not pass through the centre of the Earth — i.e. all parallels of Lat. except the Equator.



Ills. of latitude

Axis of Earth = an imaginary line terminated by the poles, about which the earth rotates from W to E, once in 24 hr.



"Poles" of Earth = extremities of the Axis.

Equator the great circle with its plane at right angles to the Earth's axis & half way between the poles.

Meridians of Longitude are semi great circles, passing through the poles. The PRIME MERIDIAN is the

meridian through Greenwich from which all longitudes are measured E. or W. to 180°.

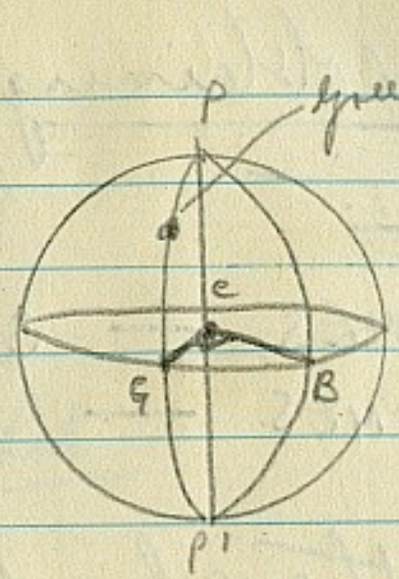
Parallels of Latitude small circles (except the Equator) having their planes parallel to that of the Equator.

Latitude of a place - is the smaller arc of a meridian (FB), intercepted between the equator & the parallel of latitude passing through the place. May be measured as its angular distance from the Equator, in degrees, mins N. & S of the Equator (FĈB)

Meridian of Greenwich

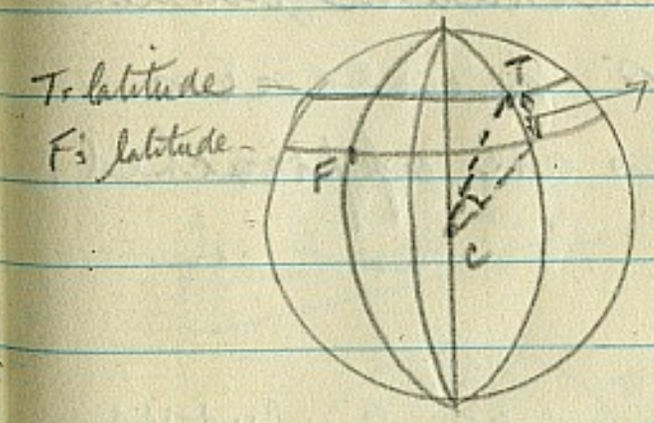
P - P' = Axis.
C = Centre of the Earth.
P.F.B.P' = A meridian of longitude

Longitude – is the smaller arc of the Equator intercepted between the prime meridian & the meridian passing through the place. (i.e) $G\hat{C}B$.

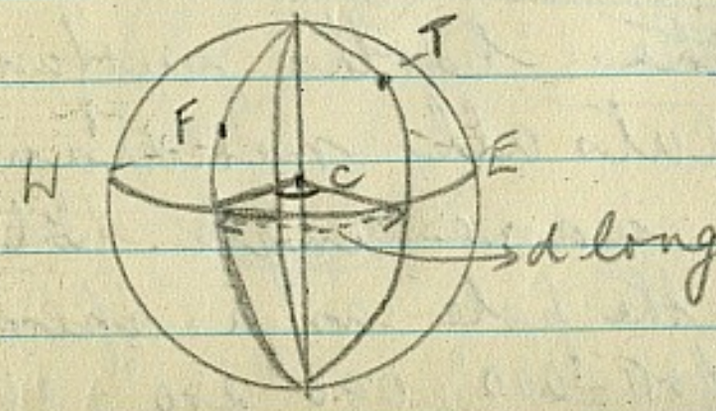


C = Centre of the Earth.
G = Prime meridian at the Equator

Difference of Lat. (d·lat) between two places is the smaller arc of the meridian through either place, intercepted between the parallels of latitude passing through the two places.



Difference of Long. (d·long) is the smaller arc of the Equator intercepted between the meridians of longitude passing through the two places.



Rule for obtaining d. lat. & d. long:—

SAME NAMES — SUBTRACT.
CONTRARY NAMES — ADD.

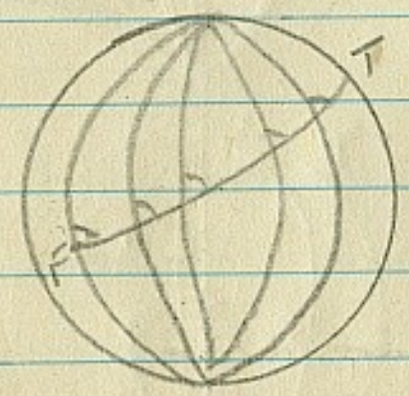
N.B. Although d. long can be regarded as angular distance measured along the Equator NEVER associate it with distance, since the distance between two meridians decreases as the poles are approached.

A Rhumb Line is a curve on the Earths surface which cuts all meridians at the same angle. It approaches the pole as a spiral except for 000°, 090°, 270°, 360°:

55° N
53° N
2° D. Lat

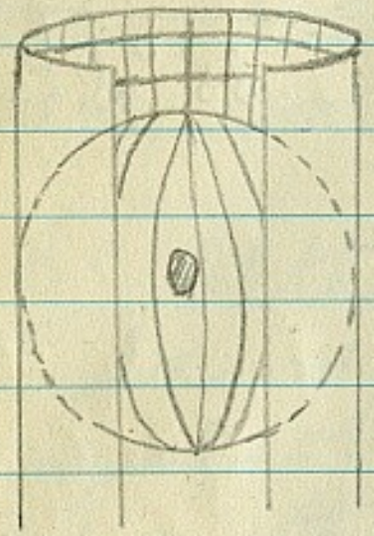
20° N
15° S
35° D Lat

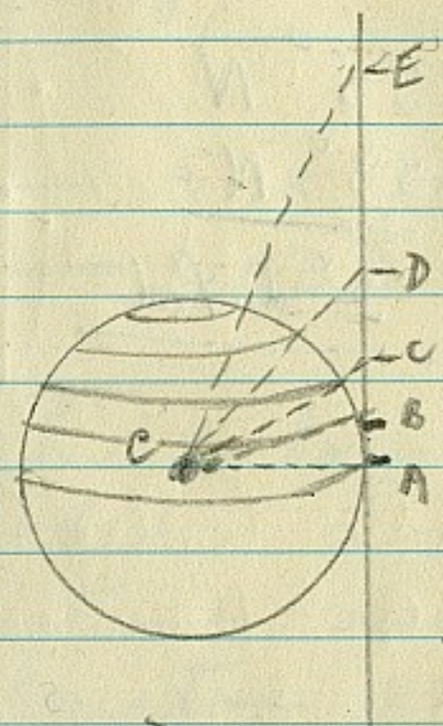
Rhumb Line F–T



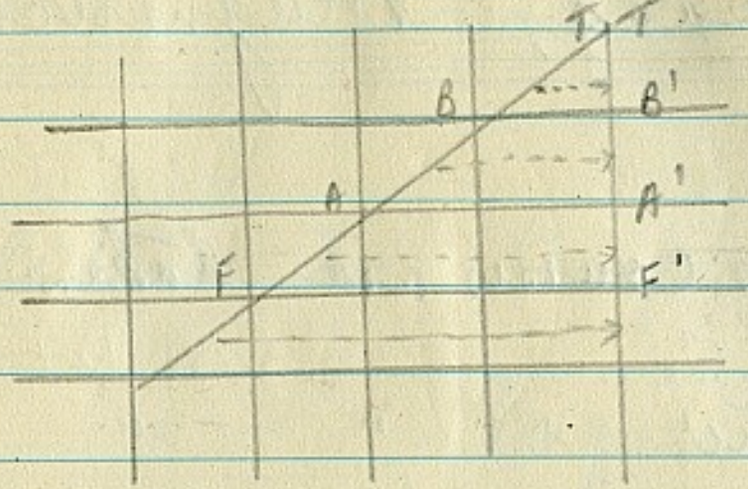
On a Mercators chart, it appears as a straight line

Mercator Chart.





AB } All represent
BC } same distance
CD } on Mercators Chart.
DE } ∴ Northerly areas
are magnified



Compass, Magnetic & True Courses.

Compass courses are taken relative to Compass North.

Magnetic " " " " Magnetic N.

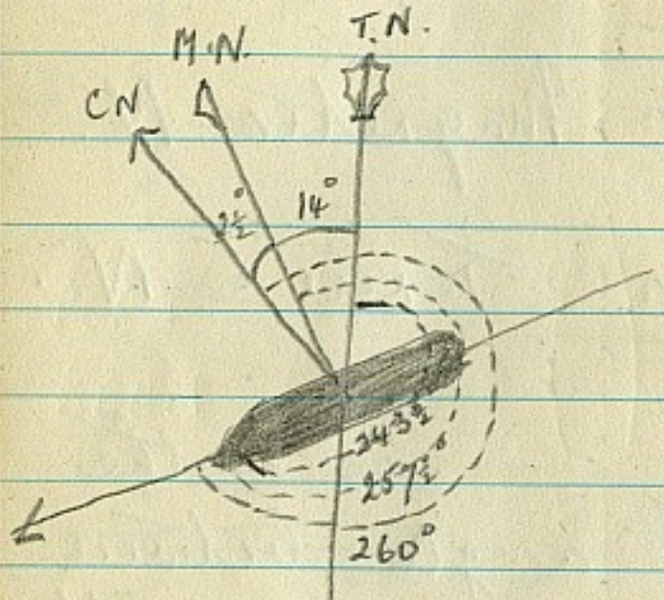
True (gyro) " " " " True N.

Variation is the angle between True & Magnetic North. It is not constant but varies with the position on the earth & with the year. Obtained from the nearest chart rose or line of magnetic variation, with a correction for the year if required.

Deviation — is the angle between Magnetic & Compass North. It is due to the ships magnetism & therefore varies with the direction of the ships head. Obtained from the deviation table or chart for the particular ship & the particular course.

Changing Compass Course to True Course:-

By Diagram



By Rule

C.A.D.E.T.

Co. Co. = S 80° W
= 260°

* Dev. = 2½° W (-)

M. Co = 257½°

Var = 14° W (-)

True Co = 243½°

* Use the deviation for the direction of the ships head when the bearing is taken.

Example Ships Co. Course = S 60° E
a Light bears N 20° W.
If the Variation is 11° W,
find the true course & the true bearing of the light.

Co. Course = S 60° E
= 120°

* Dev = 6° E (+)

Mag. Co. = 126°

Var = 11° W (-)

True Course = 115°

Comp. Bearing. = N 20° W
= 340°

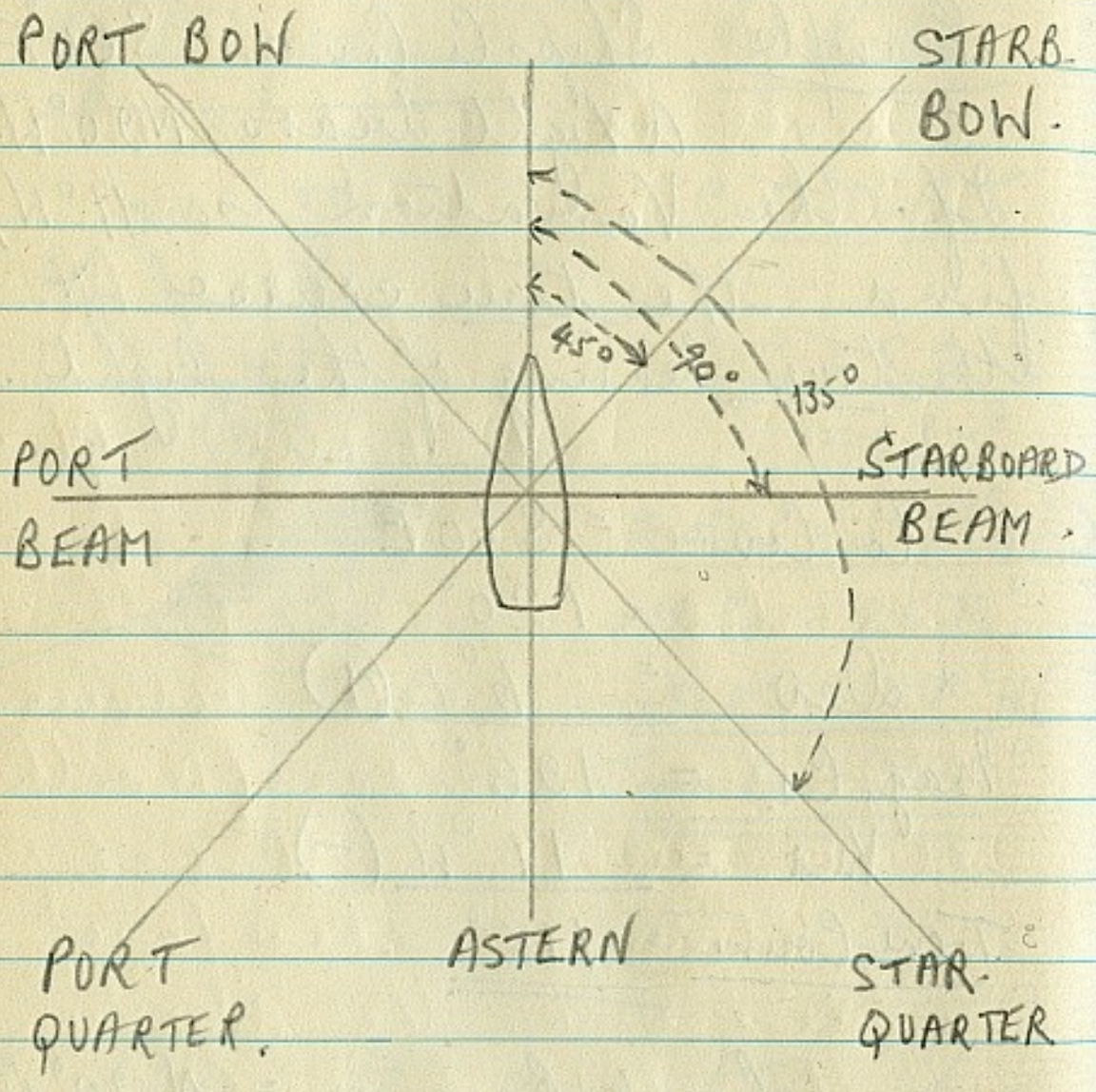
* Dev = 6° E (+)

Mag. Bearing = 346°

Var = 11° W (-)

True Bearing = 335°

RED. AHEAD GREEN.



If bearing is Green, ADD to True Course

If bearing is Red, SUBTRACT from True Co.

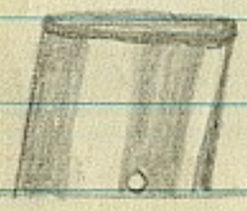
eg. Course = 020° Gyro

Light Bearing Red 90° = 290° (Port Beam)

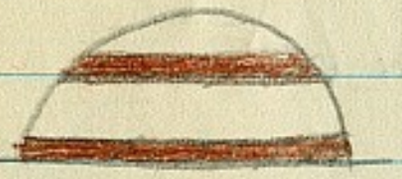
" Green 45° = 065°. (St. Bow)

Buoys.

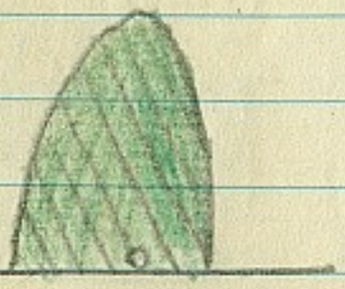
Starboard hand
Red or Black. Conical.



PORT hand.
B & Wh. Vertical Stripes —
or Chequers. Can.



Middle ground
Red & White horizontal stripes
Spherical.



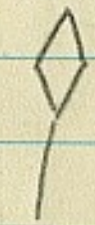
Green conical

= Wreck (in white letters on buoy)

Topmarks

Ball (Starboard).

Cage (PORT)

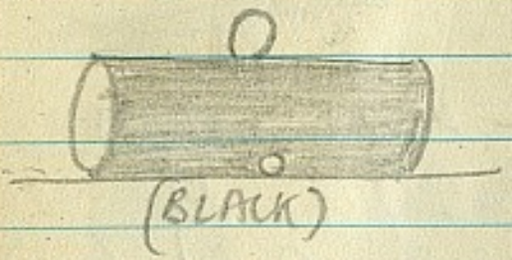


D.O

Diamond Outside
(Middle ground)

I.T.

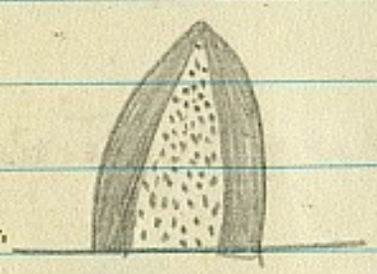
Inside-Triangle



Mooring Buoy ——→ N.B. Ring on top.

Spar Buoy ——→ To denote position of a rock etc. in a harbour

Pillar Buoy ——→ To mark a Fairway.



Spoil ground Buoy ——→ Black & Yellow Vertical Stripes

May not be dangerous if water is deep, but it' is no use for anchoring

Watch Buoy

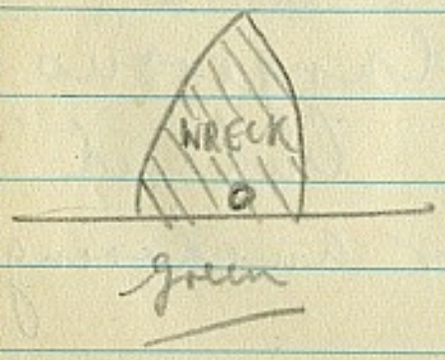
To check bearing & distance of wreck-marking or light vessel - to make sure of position in case of movement caused by a storm etc.

Telegraph Buoy

Submarine mining buoy

Green & white horizontal stripes

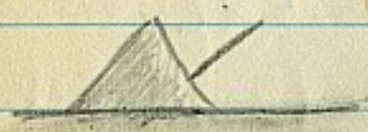
To mark submarine mining ground.



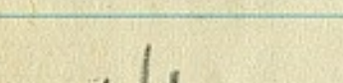
Wreck marking buoy.

Chart Markings :-

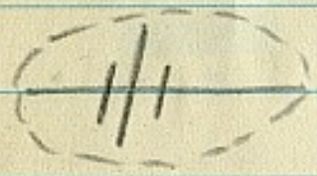
Bell Buoy.



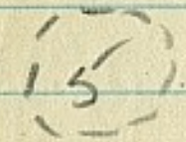
= Stranded Wreck.



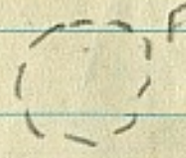
= Non Dangerous Wreck.



= Dangerous Wreck



= Wreck of known depth



= Remains of wreck

+ or (+) Rock with less than 6' of water at MLWS.

∔ or (∔) Rock awash at M.L.W.S.

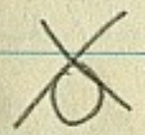
(P.A.) = Position approx.

(P.D) = Posit. doubtful.

(D) = Doubtful.

(E.D) = Existence Doubtful

 = Church.

 = Windmill.

Mercator's Chart.

This type of chart is used for all ordinary navigation.

It is so constructed that :—

(1) A Rhumb line appears as a straight line
(2) An angle on the earth's surface is represented on the chart by an angle of the same size.

The equator & parallels of latitude are rhumb lines & appear on the chart as ll straight lines. The MERIDIANS appear as straight lines perpendicular to the parallels.

N.B. The shortest dist between 2 places is along the great circle joining them v NOT along the rhumb line — even though the latter appears as a straight line on the M/Ch.

The longitude scale is the same at all parts of the chart & shown along the top & bottom margins. It is only to be used for marking in or reading off longitude — NOT distances.

The latitude scale, which is ALSO THE DISTANCE scale, is not the same at all parts of the chart. It is shown at the sides of the chart.

Mercator chart (cont'd)

The position of a ship as shown on the chart may be:—

① Dead Reckoning (D.R.) This is the position found by using only the course steered & the estimated speed. It is simply a quick & easy way of estimating the ships position without allowing for the effects of wind or sea. (Marked on the course by —|—)

② Estimated Pos. This is the pos. found by taking into account the estimated effect of winds, currents & sea & applying them to the D.R. Even so, it is not exactly correct as the estimates cannot be entirely accurate.

③ Fixes - These are the positions found by taking observations of shore objects & is the most accurate. ⊙

④ Observed Position is found by taking observations of heavenly bodies.

ADVANTAGES of Mercators Chart

(1) Rhumb lines are represented by straight lines.

(2) Angles on the Earths surface are correctly represented on the chart.

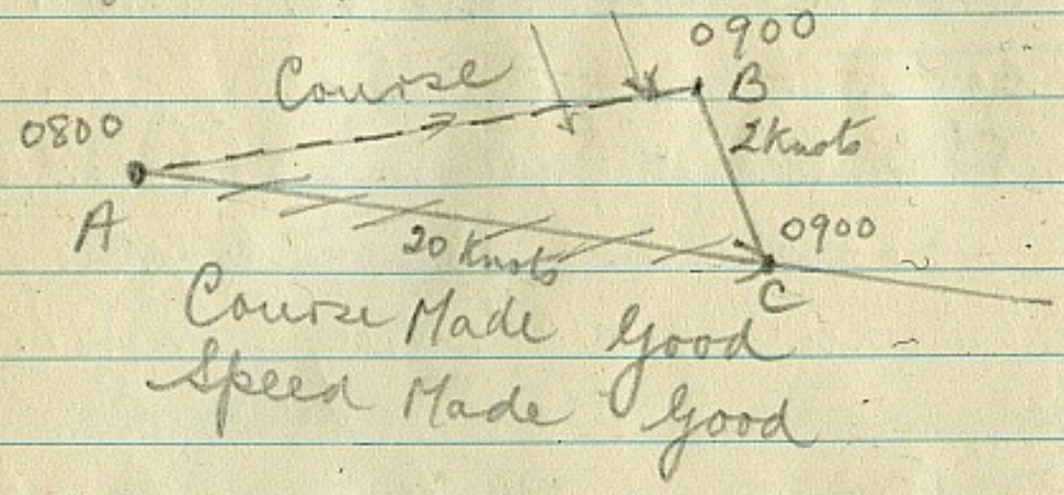
DISADVANTAGES.

(1) Areas are magnified in high latitudes.

(2) The poles cannot be shown.

(3) Great Circles are not represented by straight lines.

Effect of Tide on Course

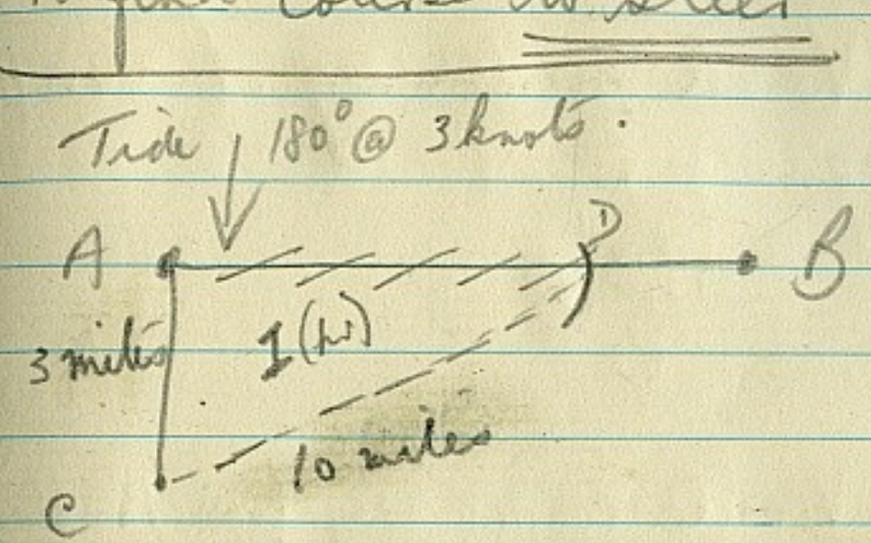


Say course steered = 080° (A-B)
Tide is running 160° @ 2knots (B-C)

Then plot the Course first.
Plot the tide, after given time.
Complete the triangle & the last line represents the "Course made good" (AC)

In this case, course made good = 110°.

To find course to steer



To get from A to B.
Tide = 180° @ 3knots.
Speed of ship = 10 knots.

Then plot tide first (AC) from C

Make an arc on AB with dividers, 10 miles apart, called D. Thus AD = course made good & course to steer = $A\hat{C}D$.

NAVIGATION LIGHTS.

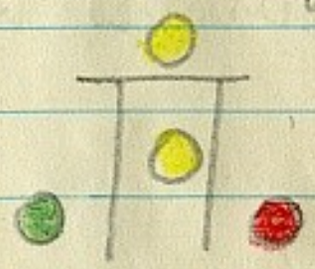
Steam Vessel under way. (under 150 ft)

[Or could be Steam Fishing Vessel, shooting or towing lines]
Sidelights — visible 2 miles.
Masthead " 5 —.

Steam Vessel under way (over 150 ft)

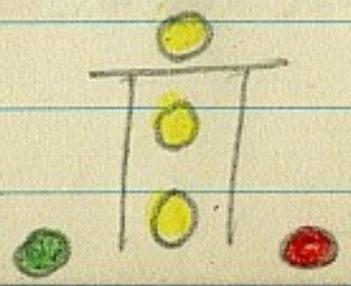
Visible as above i.e.
Right ahead to 2 points abaft the beam (S. 67½ W
S 67½ E)

Steam Vessel towing



White lights not less than 6 ft apart

Steam Vessel towing (tow over 600 ft)



White lights not less than 6 ft apart.
Lowest " not less than 14 ft above hull

Navigation lights (cont)

Vessel not under command & NOT making way:

Visible 2 miles – all round.
Not less than 6 feet apart.
14 ft or more above hull.

Vessel not under command, but making way.

As above, but with the usual port & starboard lights

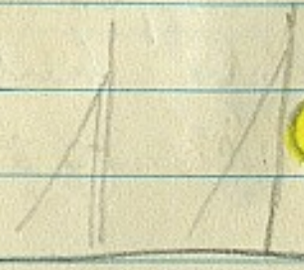
Vessel not under command, by day

2 Black balls, each 2 ft. dia.

Vessel aground, in or near Fairway.

Navigation lights (cont)

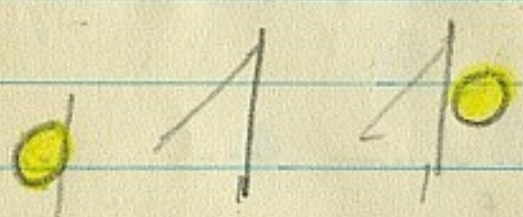
A VESSEL AT ANCHOR (under 150 ft)



Visible 2 miles - all round horizon

Not over 20' above the hull.

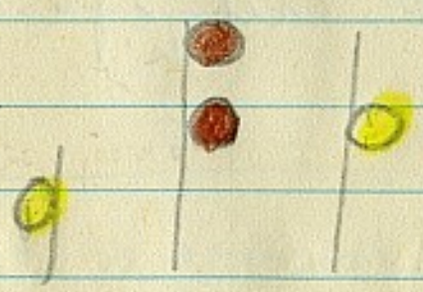
A VESSEL AT ANCHOR. (over 150')



As above but forward light = 20 – 40' above hull.

Stern light = not less than 15' lower than the forward light

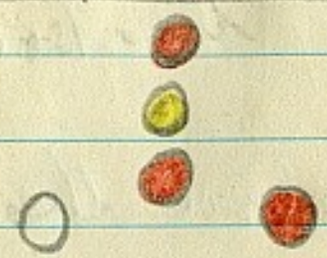
A VESSEL AGROUND in a Fairway



(Only one anchor light if under 150 ft!).

Navigation lights (cont)

VESSEL n/p. or LAYING TEL CABLES (NOT UNDER COMMAND)



Making way through the water, i.e. with usual side lights (2 miles vis.)

VESSEL, n/p. or LAYING TEL. CABLES NOT MAKING WAY & NOT UNDER COMMAND.

As above, BY DAY.

2 Red circular shapes with white diamond shape between them.

Sailing Vessel under way. or Vessel being towed

Visible 2 miles.

Navigation lights (cont)

Small Steam Vessel (under 40 tons)

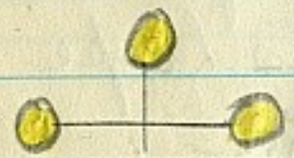
Vessels under oars or sail (under 20 tons)

(combined red + green lantern)

Rowing boat

Show white light in time to prevent collision.

Dredger at work



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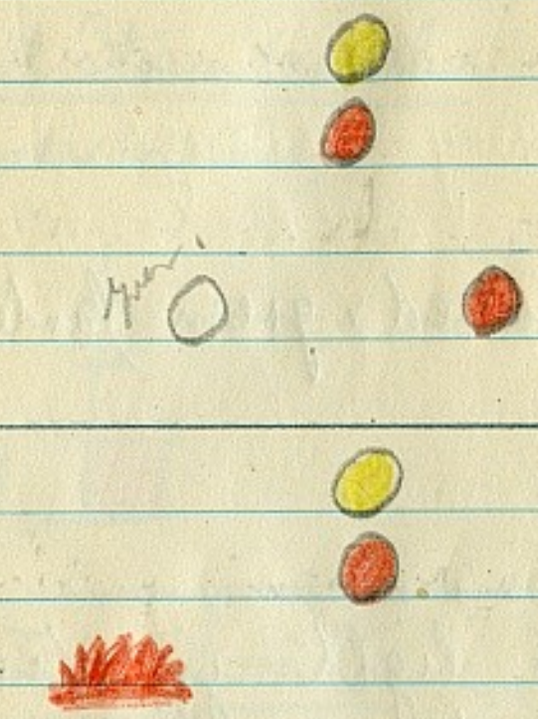
(By day) =

Safe to pass, either side

Safe to pass on side of white l.

Black Balls in place of white lights
Red flag ——— red light

Navigation lights



Open boat, fishing gear extending not more than 150 ft. one white light (all round)

way

Steam Pilot vessel under

(Flare up at short intervals)

Steam Pilot Vessel at Anchor.

(Flare up at short intervals)

Sailing

Pilot Vessel on Station.

Open boat – gear ext. more than 150 feet

gear in this direction ←

One light (yellow) can be:—

(1) Vessel at Anchor
(2) Vessel being overtaken
(3) Vessel under oar.
(4) Pilot vessel whose flare not yet seen
(5) Masthead light - side lights not yet in sight
(6) Light vessel unable to show usual lights
(7) Sailing trawler not yet shown flare
(8) Fishing boat with outlaying tackle.

Lights on Lighthouses, Buoys etc.

LIGHTS WHOSE COLOUR DOES NOT ALTER WHEN VIEWED FROM A GIVEN POSITION:—

Chart Marking	Phases
F = Fixed.	A continuous steady light
Fl. = Flashing.	Shows a single flash at regular intervals. Duration of light always less than that of darkness
Gp. Fl. = group flashing.	A group of 2 or more flashes of light, followed by a longer phase of darkness.

White represents the "light" intervals
Black represents the "dark" intervals

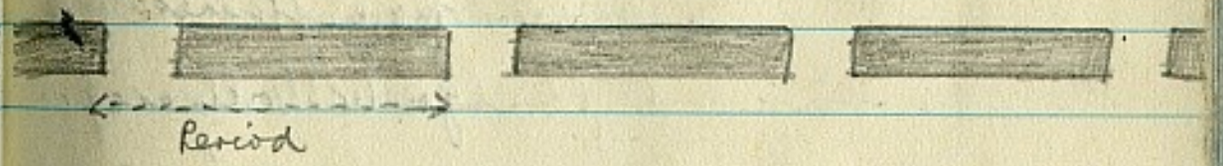


Chart marking		Phases
F. Fl.	= Fixed and Flashing	A steady light varied at reg. intervals by a single brilliant flash
F. Gp. Fl.	= Fixed & Group Flashing.	A steady light, varied at intervals by a group of 2 or more flashes of greater brilliancy -
Occ.	= Occulting.	A steady light, eclipsed at reg. intervals. Eclipse always less than the light
Gp. Occ	= group occulting	A steady light eclipsed twice or more at regular intervals — periods as above.

White & Black represent light & darkness

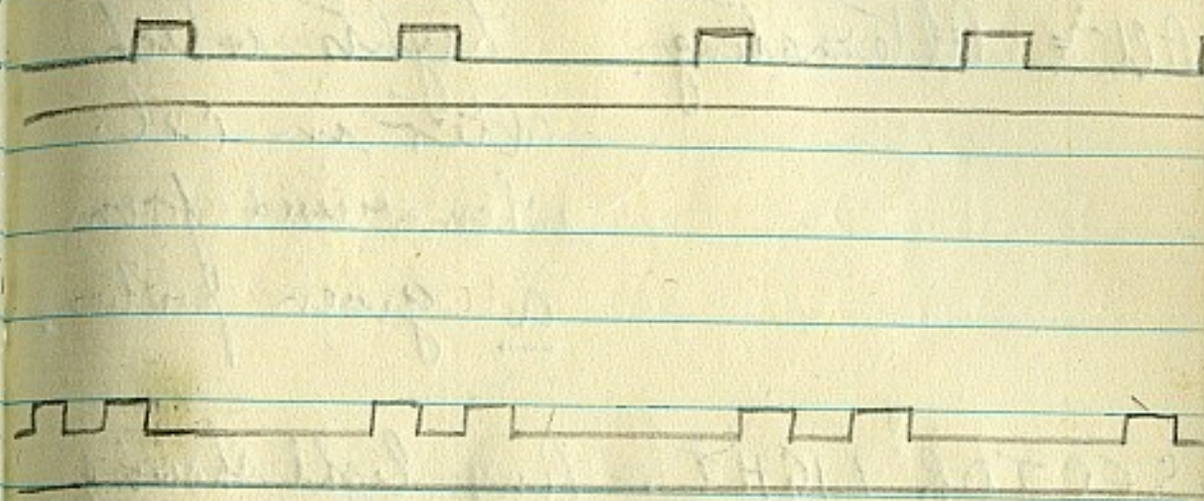
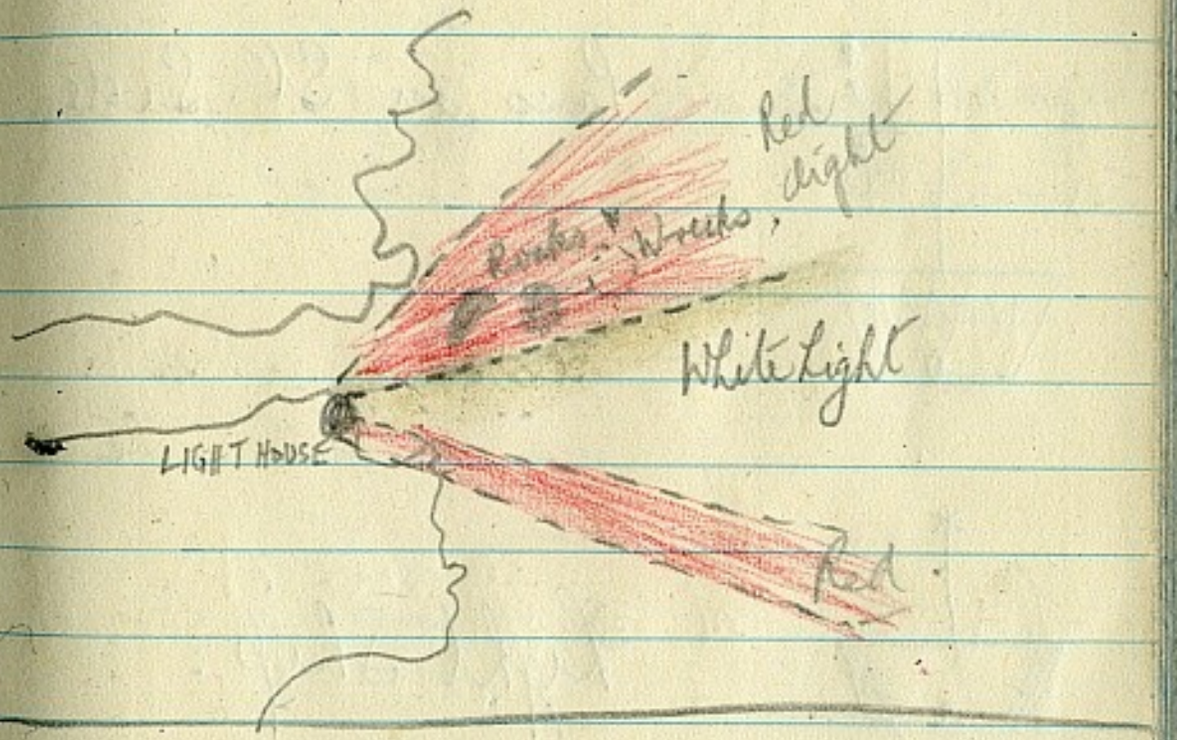


Chart Marking

Phases

Alt = Alternating. Lights which alter in col. when viewed from a given position.

SECTOR LIGHT. Any light showing two colours, NOT prefixed "Alt", are sector lights. One light shows the clear channel, for ships



Definitions:-

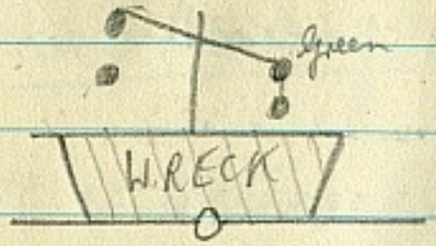
PERIOD = the interval between successive beginnings of the same phase light, not to be relied on implicitly.

U = UNWATCHED = an unwatched

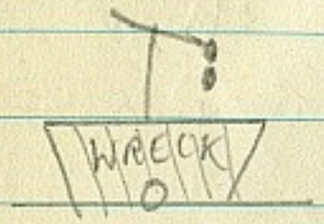
Ht = HEIGHT = Distance between centre of lantern + MHWS, in feet.

Vis. = VISIBILITY = Distance seen when observer is 15' above sea level on a clear dark night.

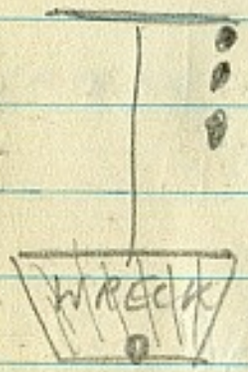
Lightships



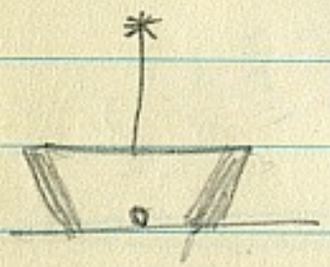
= Pass on either side



Pass on Port S.



Pass on St. Side.



Light Ship.

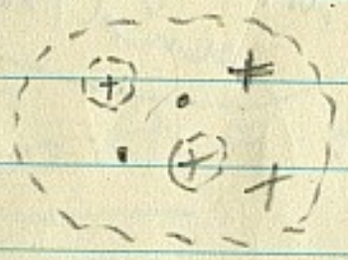
.... = 4 fathom line

.... — .... — .... = 40 fathom line.

.... = 100 " "

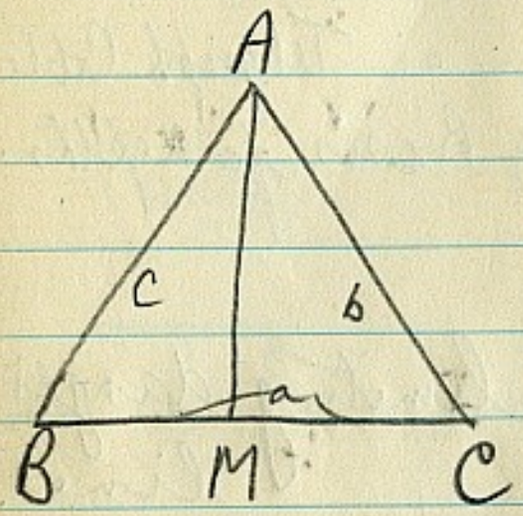
~~~~~~~~ = Telegraph Cable

DATUM LINE = Basis for depths.



= limiting danger line.
~~~~~~~~

Solution of triangles & spherical triangles



Use sine formula when given 2 ∠s and 1 side

$$\frac{\sin A}{a} = \frac{\sin B}{b} = \frac{\sin C}{c}$$

Hence $a = \frac{c \sin A}{\sin C}$ etc

or $b = \frac{a \sin B}{\sin A}$ "

or $c = \frac{b \sin C}{\sin B}$ "

And $\sin B = \frac{b \sin C}{c}$ etc.

Given 2 angles & 2 sides or 3 sides, use Cos formula

Using same triangle:-

$$a^2 = b^2 + c^2 - 2bc \cos A.$$

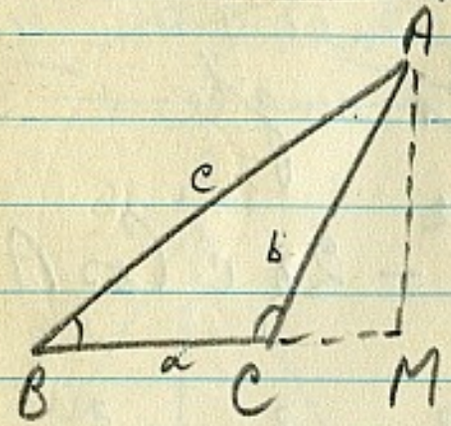
$$\text{or } \cos A = \frac{b^2 + c^2 - a^2}{2bc}$$

$$\text{Similarly } \cos B = \frac{a^2 + c^2 - b^2}{2ac}.$$

$$\cos C = \frac{a^2 + b^2 - c^2}{2ab}.$$

Therefore given 3 sides of a triangle, the cosine of any of the angles can be found & hence the angles determined.

2 sides & 2 angles

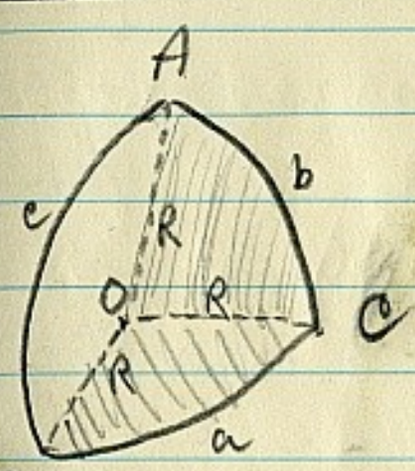


$$a = c\cos B + b\cos C$$

$$b = a\cos C + c\cos A.$$

$$+\ c = b\cos A + a\cos B.$$

Spherical Trig i.e Earths surface



R = Radius of gt. Circle

a, b & c represent sides of the ∠ and also sizes of angles BÔC, CÔA, AÔB.

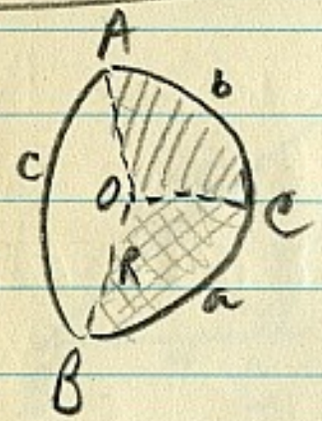
Sin A = sine BÂC
But Sin a = sine BÔC } N.B

$$\cos c = \cos a\cos b + \sin a\sin b\cos C$$

$$\cos b = \cos a\cos c + \sin c\sin a\cos B$$

$$\cos a = \cos b\cos c + \sin b\sin c\cos A$$

Spherical Δs (cont)



$$\frac{\sin A}{\sin a} = \frac{\sin B}{\sin b} = \frac{\sin C}{\sin c}$$

i.e. $\sin B = \dfrac{\sin b \sin A}{\sin a}$

etc.

Individual meaning of FLAGS.

A = 5 Red + Yellow Diagonal Stripes
B = White Flag, Red centre, Blue border.
C = Black to mast, Blue to fly, Red below, Yellow on
D = Yellow - Red - Yellow (vertically)
E = Blue - White - Blue (horizontal)
F = Yellow + Black quarters
G = White - Black - White (vertical)
H = Yellow flag with black circle
I = Blue flag with yellow St. A cross
J = White + Red triangle
K = Yellow + Blue (horizontal)
L = White flag, Red St A cross
M = Red △, with yellow tongue.
N = Yellow ▷, with blue tongue.
O = Yellow + Red flag, divided diagonally
P = Red △.
Q = Blue ▷, white St. G. cross
R = Yellow △, red St. G. cross
S = 5 Green + White diagonal Stripes
T = Blue △, white circle

= Aircraft in sight, pres. Lostite.
= Boats flag.
High = Aircraft detected by RDF.
= Gas alarm
= General semaphore message.
= COLUMN will turn to PORT
= Course change or speed (indicated) "Resume prev. course."
= Enemy information.
= Torpedo control
= Surface craft detected by RDF.
= UNIT will turn to PORT.
= Suspicious vessel in sight.
= Mine in sight.
= Enemy in sight.
= Sen. officers flag.
= Submarine in sight on Port side
= Ammunitioning (harbour). Investigation ASDIC contact (at sea)
= Submarine in sight, Starboard side
= Torpedo approaching.

Individual meaning of flags (cont).

U = White & Blue burgee
V = White flag, blue rect centre
W = Yellow flag.
X = Black ▷, 2 yellow v. stripes
Y = White ▷, red border.
Z = White & blue checked flag (4x4)

PT 9 = UNIT will turn to STARBOARD.
K = " " " " " PORT

Blue Peter = COLUMN will turn to STAR-
F = " " " " PORT.

= /
= Relative position VAN.
= " " CENTRE.
= " " REAR.
= Submarine asdic contact, on Port side
= —"— —"— —"—, on Starb. side

Special flags.

Aeroplane = White flag, Red diamond.
AHEAD. = Blue flag, White St A Cross
Affirmative = Red —, White St G. "
A/c Carrier = 3 Yellow, 3 Blue V. Strs.
Astern = Red flag, Yellow St G. X
Battle Cruiser = White & Red Vert. ½.
Battle Ship = Red Burgee.
Black Flag = Larger than others.
Blue Affirmative = Blue flag, White St G X.
Blue Peter = Large Blue flag.
Bruiser = Blue Wh Red Wh Blue horiz.
Destroyer = Yellow flag, Blue horiz stripe.
Division = ▷ Blue & White.
Sub-division = White ▷, Black burgee.
FISHERY = Blue & Yellow ▷, Quarters.
Negative = White flag, 5 Blk +s.
Optional = Yellow fl. Blue St A X.
Port = Red flag, White diag. stripe
Starboard = Green —, — I —

Preparative = Blue flag, 2 Wh. horiz. stripes
Screen = White border on Union.
Squadron (or Flotilla) = Yellow ▷, Blue border.
Starboard = Green flag, White d. stripe
Stationing = Blue burgee.
Submarine = Red & Blue horiz ½'.
Unseen = Union Jack.

FL 5 = Open Fire SEEN
MAY BE OBEYED AS SOON AS

FL 6 = Cease Fire
MUST BE OBEYED " " "

Pendants

PT 1 =
— 2 (3 Sub) = 3rd Substitute for flags
— 3 = Exercise completed
— 4 = Guide to the fleet -
— 5 = Position pendant
— 6 =
— 7 = Hoisty pendant.
— 8 = (At yardarm) Dives down on side shown
— 9 = UNIT Turn to STAR
— 0 (4 Sub) = 4th Substitute for flags + PT 10

Answering = (2nd Sub) FLAGS + PENDS.
Bearing =
Blue =
Church = Column or part addressed stand by to turn to STARBOARD.
Course = Anchoring - Man overboard.
DEPLOYMENT =
DISPOSITION =
FORMATION =
Interrogative =
(1st Sub)

Numeral =
ORDER =
Red = ~~Executive~~, Alter course in succession preserving order of the unit.
White = Alter course - leading ship together, rem. in succession.

Superior or inf. to numeral = alter course together

Paravanes

(1) Point of tow = pt. from which P.V. are towed.

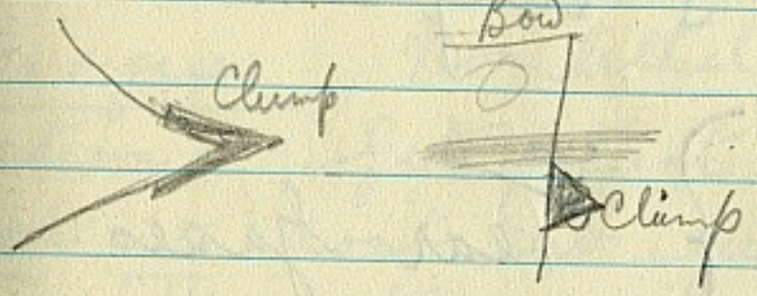
(2) Swivelling Tow connection – is the fitting to which the forward ends of the P.V. towing wires are attached in ships having bow chains.

(3) Bar Shoe is the fitting used in ships not having bow chains, from which P.Vs are towed

(4) Planing Shoe – may be used under similar conditions as bar shoe.

(5) Clump – is an extension fitted to the forefoot, through which the bow chains

thus making it poss. to get the pt of tow lower than if the chains were through the forefoot. (Sometimes known as 'Stem extension').



Hold Towing wire
clip hook
P.V derrick
Recovery wire
Deck tackle
Tripping wire

Port P.V. marked with EVEN no.
Leaded side is nearest ship
i.e. on pt side, for Port P.V.
Rudder turned to keep P.V
away from ship

Passive Defence (K.A. II)

Gases

Phosgene } Choking or
Chlorine } Lung irritants.

B.B.C. } Tear Gases. Persist
K.S.K. } Persist
C.A.P. } Non Persist

DM. }
DA. } Nose irritants
DC. }

Mustard }
Lewisite } Blister gases.

Prussic acid }
Hydrogen sulphide } Paralysant gases.

Arsine } Blood affecting gas.

Lung irritants Rest very important, even if patient feels well & also apply warmth.

Tear gases. Non lethal. Quick action. Get patient into fresh air & don't rub eyes. Wash eyes with water containing bicarb. of soda. Brown liquids.

Nose irritants. Non lethal & non persist. Visible particles of dust or smoke. Followed by acute mental depression. Give stimulants, fresh air & rinse nose, mouth & eyes with saline solution. Keep warm & quiet for 3 hours.

P.T.O.

Blister gases.

Mustard HHS. Very persistent, penetrating & lethal. Dark brown liquid in crude state, colourless when pure. Smells of mustard.

Liquid in eyes:- Delayed redness, closing of eyes & permanent blindness if not treated within 5 mins. Wash out with salt & water — 2 teasp to 1 pint — for 5 minutes & then send to sick bay

Liquid on skin:-

No immediate effect. Then redness & irritation, followed by blisters in 10-24 hrs.

Remove excess liquid & rub in anti-gas ointment for five minutes.

Vapour in eyes:- Pain & redness with temporary blindness for 2/3 weeks. Wash out as above for liquid in eyes.

DO NOT RUB IN OINTMENT IF SKIN HAS GONE RED.

Change clothing if only small drops on & have a good bath.

Lewisite:- Very persistent Rapid penetration, lethal, dark brown oily liquid in crude state Smell of geraniums.

Effects as for mustard & treatment same. Pain is immediate though & vapour is worse than mustard. If inhaled give warm sweet tea, rest warmth & air.

P.D (cont)

Paralysant Gases :—

Prussic acid (AC) Non persist, lethal, smells of bitter almonds. Even a small amount can cause giddiness.

1st Aid ARTIFICIAL RESP. & WARMTH.

Hydrogen Sulphide Non persist. lethal, smells of bad egg. Small doses cause irritation of eyes, nose, bronchitis. Large amount causes paralysis, unconc. & death.

1st Aid — as for Prussic Acid.

Blood affecting gas:— Arsine

Non persist, lethal, odourless

Arsine (cont) Weakness sickness, red urine & headache follows, & PROGRESSIVE ANAEMIA.

1st Aid Rest, warmth & call med. officer soon as poss.

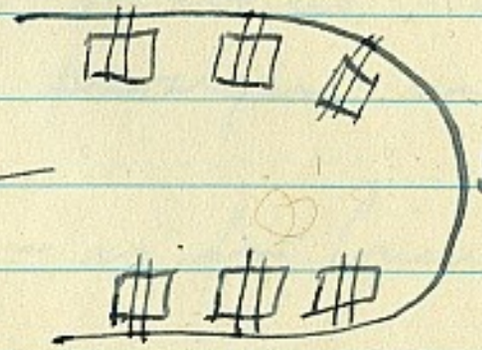
Passive defence (cont)

Weapons used with Gas:-

The chief gases likely to be used are mustard & phosgene, possibly mixed with tear gas to cause confusion.

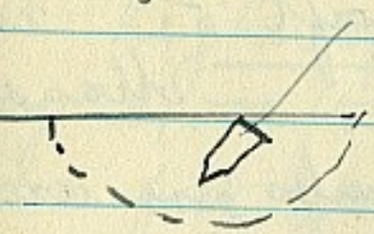
Chlorine gas was first used in trenches in 1915 — loosened from cylinders in front trenches, when wind conditions favourable.

At Sea



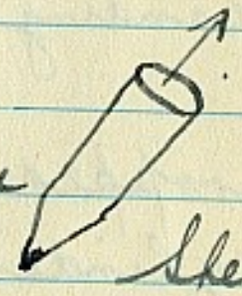
Destroyer can carry 37 tons of gas, so 9 in a flotilla would have 330 tons. With a wind of 10-15 knots, this would spread gas sufficiently to casualties 75 miles to leeward.

Shells Can be concentrated in one spot with deadly results.



⅓ stops in crater
¼ is shattered with explosion.
Rest does the damage.
(5/12).

Base ejection shells:-



Small propellant charge forces gas thro' base. Shells can be burst over target & will descend on enemy. None wasted, which is advantage over previous method.

Weapons used with gas:-

4" or above, Spigot Mortar

Gas bomb of 25 lb approx., used. Range to 1000 yards & fired at 15 rounds/min.

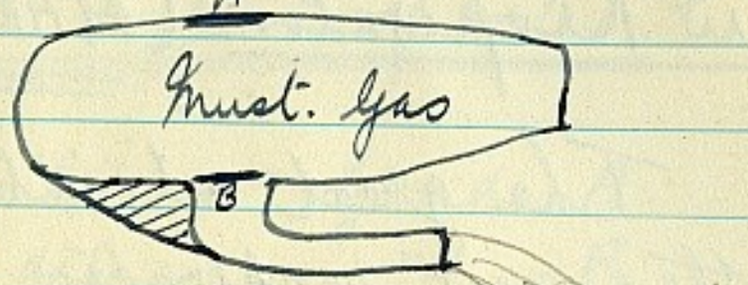
Bombs from Aircraft:-

Usually small 250 lb bombs are used. Large ones could be concentrated on an important target eg. docks, landing places etc.

Sea mines also dropped by parachute — cylinder of gas

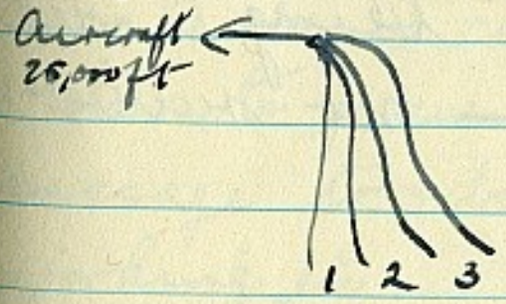
Spray from Aircraft —

Containers called S.C.I (spray container installation) used.



A + B = Bakelite discs.

A high spray attack (say 25,000 ft) drops at 1000 feet per min. So gas may arrive well after planes have passed.



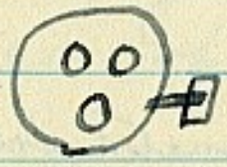
1 = grossly contaminated for 3/4 mile
2 = Heavy contamination for 1 1/4 miles
3 = Light- " " 2 "

Can also be sprayed from low alt,

New Respirator (MARK II)

The great advantage of the new respirator is that only half the resistance is offered to breathing compared with old one. This is of great advantage to commandos etc.

Container is on the left side of FACE PIECE instead of being carried in haversack — no rubber tube etc.



The container is 1/3 weight of the old type

Old Type Respirator:-

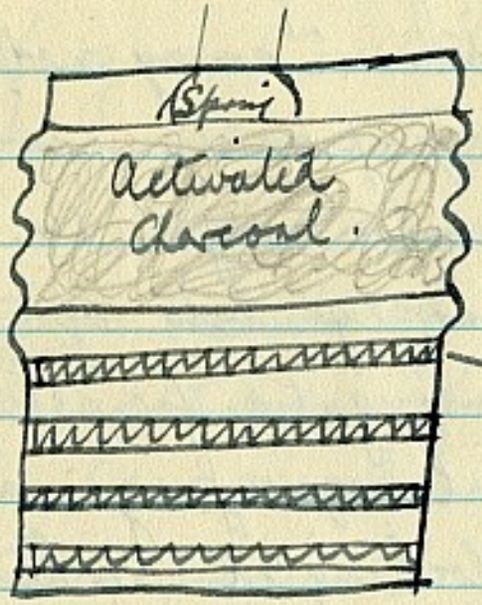
Civilian = Grade A
Civil defence = " B
Service = " C.

Eyepieces are tripler.
Outlet valve on facepiece must be gas-tight fit. ∴ carry nothing but anti gas equipment in haversack, as valve may be rendered useless by bits of tobacco etc

Tube is corrugated for strength & also to prevent squeezing air passage to & blocking it, when working etc.

Container Red E6 type now.
Made of sheet iron & tinned to prevent rusting.
All have water gauge test before leaving works.

Necks are weakest part & must be taken care of. Keep container away from water, espec. salt water, or contents are damaged & case may be corroded & finally holed.



Mixt. of 80% cotton wool & 20% blue asbestos wool, packed under pressure This deals with cloud gas.

Charcoal absorbs vapour gases & is treated chemically to counter Arsine gas.

ACCIDENTAL GASES.

Above are gases which are not used in warfare, owing to cost or difficulty in making & use. They may be encountered on board ship, in case of accident or action.

Some are not countered by the service respirator & the only way to combat them is to have an oxygen-supplying apparatus.

Those NOT protected by respirator.	Gases which are countered by respirator
CO	Nitrous fumes } For a short time only.
CO_2	Ammonia }
Methyl Chloride	SO_2

Accidental Gases (cont)

C.O. is inflammable, lethal, odourless.
Giddiness, headache & weakness occur, followed by collapse.
1st Aid — Air or artificial resp.
May be encountered in fumes from explosions or internal combustion engines.

CO_2. Invisible, odourless. Found after fires or in improperly ventilated places e.g. potato lockers not kept vent. & submarines.

Methyl Chloride. Heavier than air, lethal, invisible & odourless. Gives feeling as of drunkedness. Can be cause by fumes from refrig. plants.
1st Aid Fresh air and artificial respiration.

Nitrous Fumes. Faint orange yellow in colour. Lethal, acrid smell. Action is similar to phosgene, but may be felt 2-28 hrs. later. Resp. gives moderate protection for a short period.

Ammonia. Again caused from refrigeration plants & is lethal in strong concentrations. Strong smell lachrimatory & effects as for Chlorine.
1st Aid Rest & warmth. Resp. gives protection for short period only & then contains needs replacing.

Sulphur Dioxide Colourless, non persist. & lethal. Irritation of breathing passages, cough & choking follow. Resp. gives good protection. Found in funnel smoke & after fumigation.

Salvus breathing apparatus :-

This is used at sea, in case of gases which are not rendered harmless by respirator.

Cylinder of oxygen is carried & a container, into which the spent gases are breathed out. Here all the CO_2 is taken up & the rest is inhaled again, with approx 4% of oxygen from the cylinder. The facepiece is similar to respirator.

R valve regulates the oxygen, so that a little more or less than 4% can be used, as necessary

Lasts for about 1 hour & a gauge shows how much oxygen is used & left

Personal cleansing.

If caught with spray of mustard gas (eyeshields & cape on) proceed as follows :-

Cotton waste – mop up surplus on skin.
Ointment – rub in to affected pt. of skin.
Eyeshields – remove & renew.
Clothing – remove & leave in bins, for avoidance.
Decontaminate – small arms, equipment, by ointment.
Ointment – 2nd application on hands, as they may have been cont. again in doing above.

Anti-gas, protective clothing

Gum Boots Keep out mustard liquid — soles for 48 hrs, upper 18 hrs.

Heavy clothing (black). Keeps must. liquid out for 2 hours. The ordy. seaman's oilskin in good condition will do the same also the sou'wester.

Hood } Keep M.L. out for 1 hour
Gloves }

The light clothing (yellow) will also act for 1 hour only. This includes leggings, short jacket & curtain (civil defence kit) and also the service anti gas cape.

Impregnated overalls can be used when working in an area with vapour from mustard gas about — say on decks after a raid.

"Wigan Cloth" is used to protect stores in the open. A 4" air space is left between the cloth & stores, by building a rough cage to throw the cloth over.

"Pathway anti-gas" can be used in strips, cut off from a roll. Gives protection 1½ hours — say for crossing roads awaiting decontamination, placing on splashed thwarts in a boat etc.

Decontamination after Mustard Levisite LIQUID.

Means of decontamination are as follows:—

① Removal as on decks etc. Cut sand down, let this absorb the liquid & then remove.

② Sealing by bleach ointment, until such time as it can be removed.

③ Burning - adding bleach powder only will cause it to burn. Personel down wind must be warned.

④ Evaporation - in remote districts, small amounts may be left to evap.

⑤ Boiling — as for clothes. Some do not require so high a temp.

⑥ Chemicals - Base is bleach powder, which keeps only 7-14 days when exposed to air, so keep tins airtight. Water added gives bleach cream or paste.

Anti-gas ointments 2, 3 & 5 are also used.

C Q mixture is used on painted surfaces. It softens the paintwork & lets the bleach get through to get at the mustard.

The above methods have to be applied differently to varying materials, as follows:—

Clothing If vapour contact only, hang up to air for 1 or 2 days. If sprayed - boiling or hot H_2O needed.

WOOLLENS - boil for 1 hour, plain water.

COTTON · LINEN - - - - - , add 2oz soda to 10 gals water

WEBBING. - - ½ - - " —

(Decontamination cont.)

Oilskins. Place for 1 hour in water of 203-210°F - that is, just below boiling pt.

Rubber. One hour in boiling water.

Seaboots & antigas gloves 2 Hours " " "

Respirator Facepieces 3 " " " "

Leather (Shoes etc) Place in water for 2 hours at a temp. of 110° to 120° F.

Decks:- Mix 2 parts bleach powder to 1 pt. sand & add H_2O to make a cream.

Hose down decks, washoff surplus & apply cream to affected places, scrubbing for 15 mins. Leave 6-24 hours, then remove cream & repeat process once or if nec. twice. Fill up seams again & weather will do rest if small traces left.

Steel Decks. If in good cond., give scrubbing with cream & washoff. If rusty, proceed as for wood decks.

If very rusty, add 1 gallon C.Q. mixture to 14 th bleach.

Rubber compo. decks (Latex) Fairly impervious to liquid mustard & a good wash down after applying cream should suffice.

Paintwork Thick layer of bleach & C.Q. If vertical wall, add vaseline to make it adhere

(Decontamination, following Mustard Lewisite liquid) cont.

Linoleum :- Destroy & see if liquid has damaged surface below lino.

Tables, wood fittings As for decks, then plane off surface & burn shaving.

Canvas awnings, covers etc. Apply bleach paste & leave to weather or wash down in few hours.

Ropes. Leave spray-contaminated ropes to weather. Boil heaving lines contam. with splashes, but big ropes will have to be destroyed.

Wire Rope - Swab off & leave to weather. If rusty, throw overboard & replace.

Roadways :- Approach from windward, make area with yellow cones & apply bleach powder with shovels. Any pools should be soaked up with sand or earth. Then leave.

Craters. Fill up & leave, sealed up.

Grass - Burn if long & warn personel to be ware fumes. If short grass, apply bleach powder & leave.

N.B. Always use CREAM, not bleach powder on ships, powder flies about & could do much harm to guns etc.

Decontamination for other liquid gases:-

K.S.K. Equal volumes of glycerine & caustic soda. Plaster on objects contaminated & leave.

BBC. Use lime – 5 lb to a gallon of water. Clothing may be boiled or just aired.

Detail for ABOUT TURN

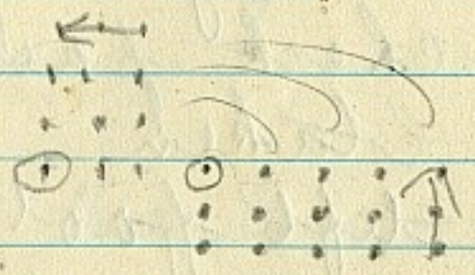
This command is given on 2 successive beats of the right foot. A check pace is then taken with the left foot.

Three successive mark time paces are taken with the arms to the sides, whilst turning through an angle of 180°. The feet are lifted well clear of the ground, so as to maintain the same cadence.

Step off with the left foot, taking a full pace of 30" & swinging the arms.

TO CHANGE DIRECTION, WITHOUT CHANGING FORMATION.

From the halt to the halt, change direction LEFT, LEFT FORM:—

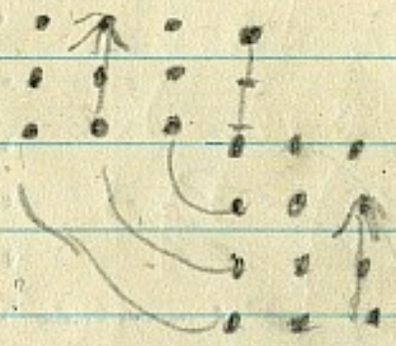


On the order (as above) the left hand man (of the front rank) = Ⓐ turns LEFT. The rest of the front rank LEFT INCLINE. The remainder stand fast.

On the order Quick March the left h. man takes 3 paces forward & halts. The remainder align themselves on his right, picking up their dressing — front rank by raising their l. arm — & stand to attention.

TO CHANGE FORMATION, WITHOUT CHANGING DIRECTION

From the halt to the halt, on the LEFT FORM SQUAD.



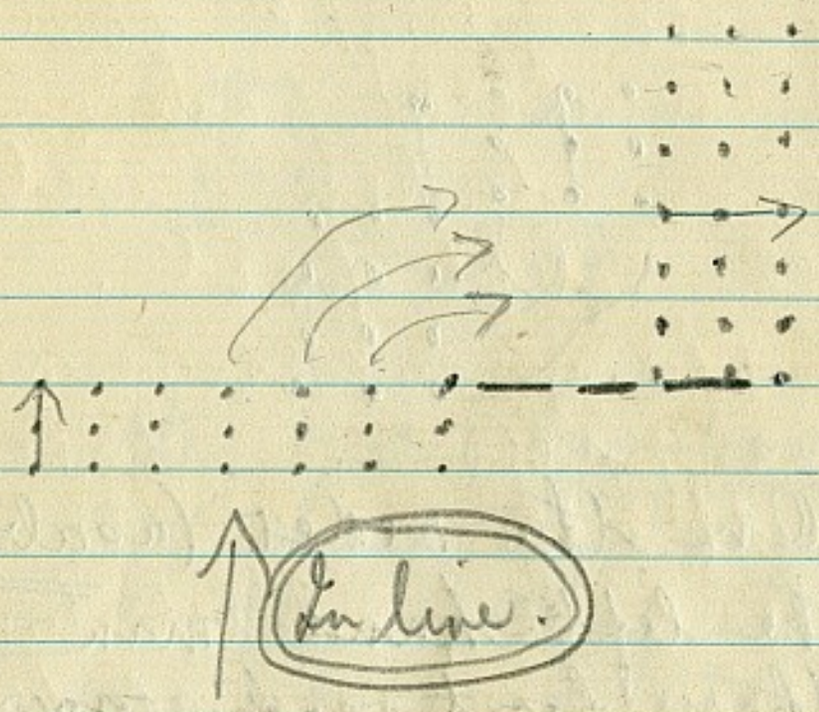
On the order (as above) the left hand man of the front rank STANDS FAST, the remainder left incline.

On the order QUICK MARCH, the left hand man takes 3 paces forward & halts. The remainder align themselves on his left, pick up their dressing & stand to attention.

TO CHANGE DIRECTION, WITHOUT CHANGING FORMATION

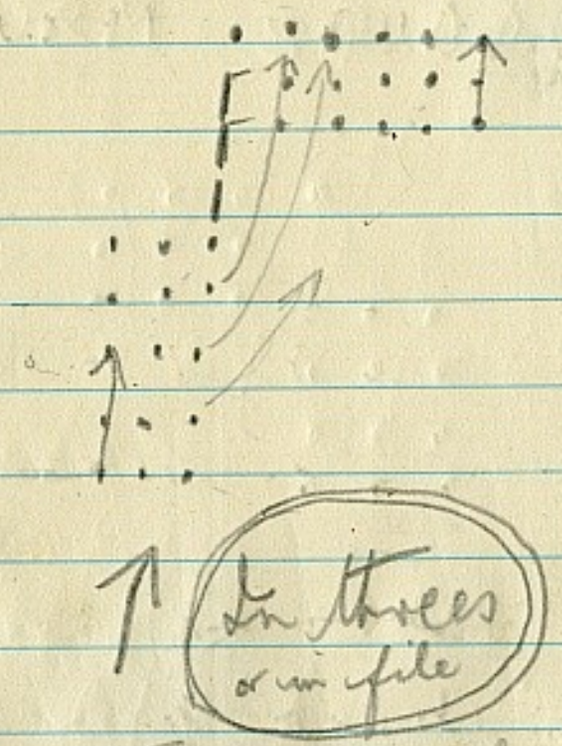
Squad Drill

Change Direction Right — RIGHT FORM.



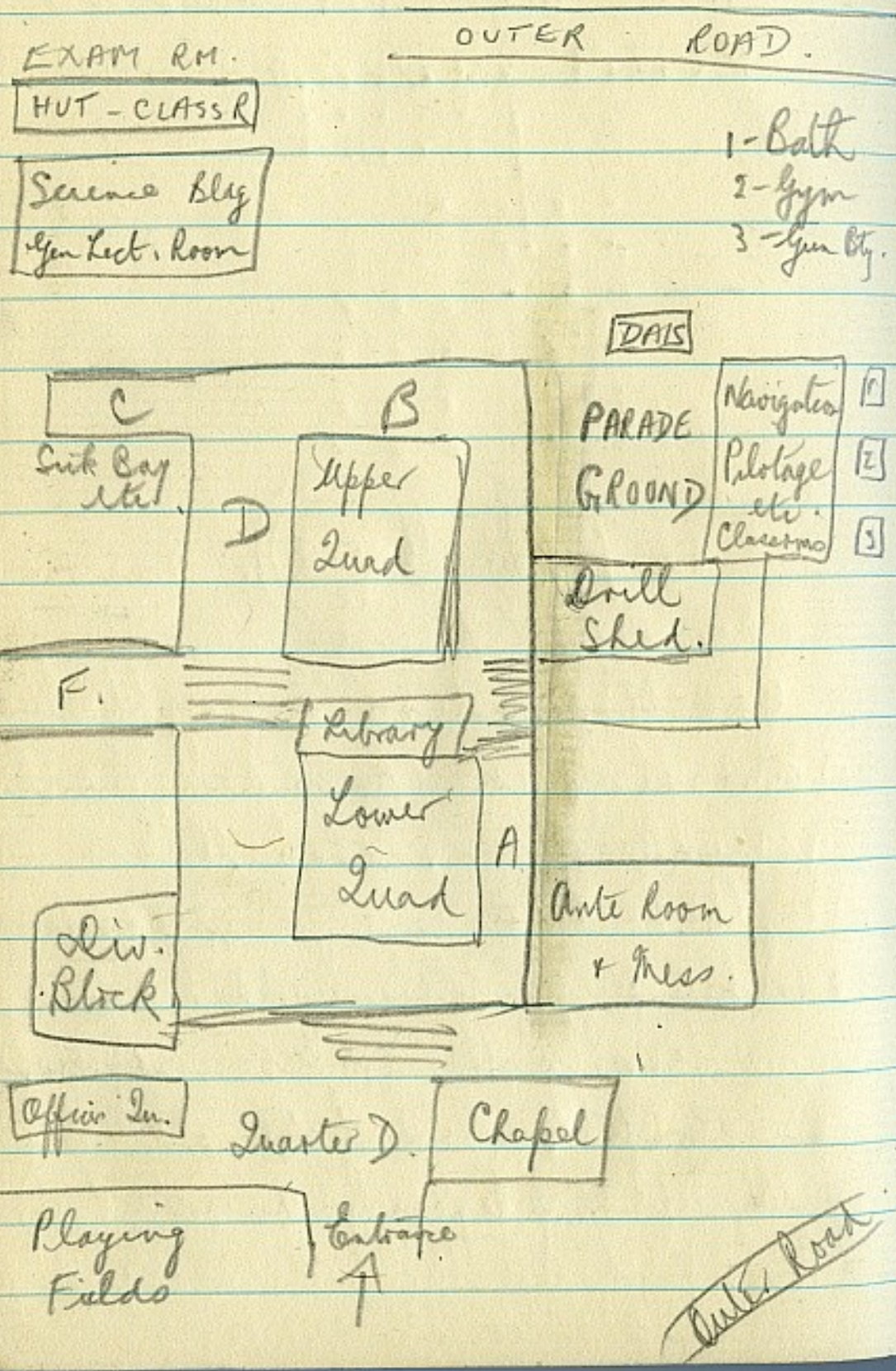
On the order the right hand man turns right, takes three paces & marks time. The others turn half right & form up (aligning themselves on his left & picking up their dressing and covering) whilst marking time.

ON THE RIGHT - FORM SQUAD.



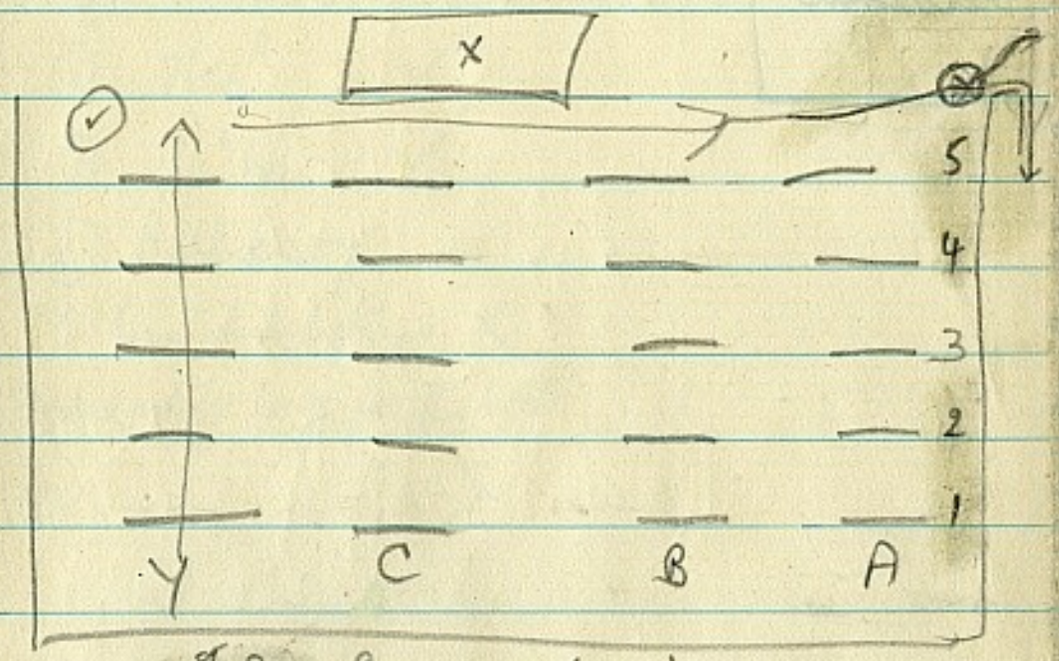
On the order, the right hand man takes three paces forward & marks time. The others right incline & align themselves on his right (the right h. file now forming the front line, the middle file forming the middle rank & the left h. file forming the rear line) They pick up their dressing & mark time.

PLAN OF LANCING COLL.



Parade ground at L.

5 Divisions of 4 classes each
(classed up at Mowden)



1st Div. Comm. orders:-

"Division will advance in columns from the left (Y), remainder left turn" (A. B + C)

Class Capt. A B + C

"Into line Right turn (by the left)

Then (=) M. to the R. in 3's — Right turn "

at (*) Double March — Right Wheel

Sicily

Catania

Palermo

Messina

① 4m ✓

② 16 Knots ✓

③ N50E ✓

④ S52E. X

⑤ 38M ✓

⑥ 264° ✓

⑦ 11°W. ✓

⑧ Bell Buoy ✓

⑨ One which light is X
blocked out for longer per flash light

⑩ X

V. 6°E (-) dev. BR 45K

	True	M.	C.	
①	029		027½	= N27½E
②	272	266	261½	= S88½W
③	177	171	177½	~~= S 1 E~~
④	298	292	297	= N63W
⑤	088	082	080	N80E
⑥	356	350	355½	N4½W
⑦	199	193	188	S8W
⑧	106	100	96	S84E
⑨	053	047	49	N49E
⑩	255	249	250½	S71½W
⑪	002			N1E
⑫	221			S32½W
⑬	345			N15½W
⑭	135			S57½E
⑮	184			S8½E
⑯	268			S84½W
⑰	092			N84E
⑱	320			N41W
⑲	215			S25½W
⑳	100			S89E

① N 70°E ✓
② White ✓
③ 36 fathoms ✓
④ Wrecks ✓
⑤ ~~South of wreck - 26 fathoms~~ X
⑥ ~~X~~ ✓
⑦ Visible 21 mile ✓
⑧ 14° ✓
⑨ flat Sandy ✓
⑩ 1942 X
⑪

Time T Course Speed Remks. Ans

1000 HTB 150° 30 Km. Lough = 066° ✓ 50° N 6° W

N light 113.

023.

1024 SML 288.

1036 Echo. Green 50° dist 10: 216° ✓ = S36°W

1042 Charged towards echo.

1054 Lee aft. ship ✓ 124°

— Alter to get back by 118 on reciprocal. = S56E

1118 Obs. 49°22'N 5°41'W 10½ miles

1130 How far from ship ✓ ✓ ✓ 46 miles

1142 To Plymouth = 043° by 406.

C to T. T to C.

Variation 15°W (+) V. 13°W (+)

(1)	254½	✓	I	M	C	
(2)	090°	✓	(1) 030°	043	046°	
(3)	351°	✓	(2) 271°	284	288	
(4)	155°	✓	(3) 176°	189	184	
(5)	294°	✓	(4) 299	312	317	
(6)	144°	✓	(5) 089	102	098	
(7)	182½°	184	(6) 357	370	375	
(8)	337°	✓	(7) 200	213	210	
(9)	~~~~		(8) 107	120	114	
(10)	078°	✓	(9) 052	065	065	
(11)	002½°	✓	(10) 256	269	272	
(12)	210°	✓	(11) 003	016	011	
(13)	330½°	✓	(12) 222	235	235	
(14)	115½	✓	(13) 345	358	363	
(15)	322½	✓	(14) 136	149	142	
(16)	~~~~		(15) 185	198	194	
(17)	~~~~		(16) 269	282	286	
(18)	225½°	✓	(17) 093	106	107	
(19)	288°	✓	(18) 321	334	339½	
(20)	058½°	✓	(19) 216	229	228½	

Time Tr. C. Sp. R. Ans.

0800 140° 3' from E.D.L.

Res 100° 15

N 46E ✓ 2 Patrol 10' from Bullock Bank

N72W ✓ 200 20. ✓

S44W ✓ How far from objective 6·6

N43W ✓ Red 45°. Dist 4'. Object = 1½ min away

S82E ✓ 50°40' N ✓

N15E ✓ 1°10' E.

S30W ✓ Towing X No Resp.

~~S50E~~ X Clear Course? 013° ✓

N65E ✓ 28 m. ✓

N88W ✓ 10-24 ✓

~~N75E~~ X 576 E

S55W ✓

N3E ✓

S38E ✓

S14W 13

N~~74~~W ✓ 107 114 119 ✓

S79E ✓ = S 71 E

N20½W ✓

S 48½W ✓

A.

Ships lights. NO

~~V. with full lights~~ G R

~~V. 2 Red lights on mast~~ O O

+ ft + Starboard O O

= Underway, not v. comm

~~2 R Lights only~~ O

= ~~NOT UNDER WAY~~ command

HAMPERED VESSELS

= 12 cable ship site

Red } neither under
Red } way nor command

+ P + St } = Under Way NOT under comm'd

2 White } = towing another
+ P + St

3 White } Towing one or more + 600 ft
P St } exceeds 600 ft

Ball
Red ● } = Vessel laying
Red ◇ } cable, by day.

①	~~170°~~	145	
②	320°	340	
③	due N.	✓	
④	190°	✓	
⑤	090°	✓	
⑥	320°	✓	
⑦	160°	✓	
⑧	160°	✓	
⑨	070°	✓	
⑩	225°	✓	
⑪	090°	✓	
⑫	335°	✓	
⑬	190°	✓	
⑭	195°	✓	
⑮	020°	✓	
⑯	270°	✓	
⑰	140°	✓	
⑱	140°	✓	

Time	True Course	Sp.	Rmks	Ans.
1000	Pos. 50°10'N 0°20'E ✓			
	Stg. 030°	10.		
1018.	310°.			
1030.	340°.			✓
1048			Lat + Long? -	50-16.6' N 0-18.5 E
1054	030°	15.		
1154	50°30'N 0°30'E		Obs Pos. - diff from DR =	9 Cables ✓
1206.	Make for { 50°30'N 1°00E }		- Course? =	278°. 098 ✓
1224	Engine down 16 mins.			
= 1240	Same Course	10 Kn.	Revie ⑥	
1400	Set course for Body Hd			

Red + Wh + green lanterns } Steam trawler under way. = 14.09.
White light

● Two black balls. } Vessel under way not comm 290° ✓

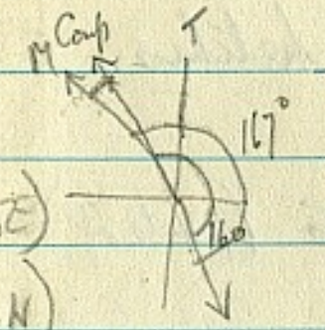
White light + flare = small vessel Sail or Steam fishing gear -

white light
Red + green lanterns } = Sail under 65 tons
on forestay

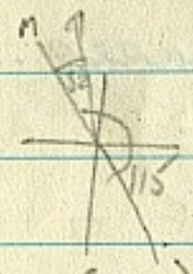
Variation 12° W.
Deviation of from BR 454.

Compass.		Magnetic.	True
S 20° E	(160) =	167°. =	✓155.
N 45° W	(315)	310	✓298.
109½ =	S 70½ E.	S 65° E (115°)	✓103°
080° =	N 80° E.	N 82° E (082°)	✓070°
198° =	S 18 W.	S 22 W. (202°)	✓190°
229½ =	S 49½ W.	S 50 W (230°)	✓218°
N 62½ E	(062½)	N 61½ E (061½)	✓069½°
N 20½ W	(339½)	N 26° W (334)	✓322°
S 15½ W	(195½)	S 19½ W (199½)	✓187½°
N 62 W	(298)	N 66½ W (293½)	281½.

Comp	M.	T.
S 23° E (157)	S 16° E (164)	✓152°.
S 7° E (173)	S ½° E (179½)	167°



(S 25 E)
(N 62 N)



(S 77 E)
(N 70 E)

N 20° E (020)	N 15½ E (015½)	003½°
S 44° W (224)	S 44½ W (222½)	210½°
N 35° W (325)	N 29½ W (330½)	318½°
S 27 W (153)	S 20° E (160)	158°
N 88 E (088)	S 89° E (091)	079°
S 42 E (138)	S 35° E (145°)	153°
S 82½ W (262½)	S 80° W (260)	248°
N 84° W (276)	N 87° W (273)	261°
N 74° W (286)	N 78° W (282)	270°

Index.

Time	Course	Speed	Remarks
0700	120°	15.	10 dive S N Tower.
0820	170°	"	20 m DR.
0900	240°	"	
1000	due W	"	
1120.	To Stg. pt	"	Course to steer
	026°		What Distance?

TIME	T. Course	SPEED	Remarks
1000	Pos on arbe of Conf Rge.		
	290°	10 Kn.	
1018	250°	15 —	
1030	180°	20 —	
1036	Wreck Sighted 3 miles due W.		
1042.			What Bearing of Wr.
1048.	How far from Wreck.		
1048.	130°	18 K.	
1054.	What Course for original position		
1100	Proceed to 50-30 N 0-30' E		
	What course to steer		
	How far? —		

Res

D 26 m.

50-02° N — 0° - 43' W.

262°

026° ✓

2 Lo. ✓

~~48 20~~ ✓

Clear.

304° ✓

5M. ~~8 Cables~~ ✓

033°.

326° ✓

~~2 Hrs 4 Cables~~

~~45 52~~ S

~~60~~ 52

140° ✓

140 ✓

135° ✓

135° ✓

020° ✓

280° ✓

095° ✓

30 ✓

20 ✓

05 ✓

00 ✓

24 ✓

36 ✓

30 ✓

15 ✓

030° ✓

18 ✓

22 ✓

NO.

10 m ✓

5 — ✓

10 — ✓

12 — ✓

5 ✓

6¼ ✓

7 — ✓

31 Kn. 12-35

12 = 2-45 ✓

20 ✓

7⅓ ✓

2 — ✓

5 — ✓

18 — ✓

9.6 — ✓

9 — ✓

3 — ✓

2.4 — ✓

1.8 — ✓

7.2 ✓

J D O X R V B P A

T I F I K C H Q W Y U I E N

No. K-10 f

22/5/ 1944

This is to Certify that E. BLAND

has served as a Ty. Act. Sub/Lieut. RNVR in

H.M.S. AMBROSE

under my command, from the 6 day

of March 1944, to the 22 day of May 1944, during which

period he has conducted himself* to my satisfaction

(under 3 months)

K.E. Crombie

Captain(S)

~~H.M.S.~~ 9th S/M Flotilla

*Here the Captain is to insert in his own handwriting the conduct of the Officer

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