1. Introduction
Navigation
— Ship building — inventions
— Launch — Rigging —
— Gun provisions —
+ ~~Gunpowder~~ — Dark —
Rates
Gu M Mon Lens Pr
1 = 100 = 850 · 150 222 : 52 Do
2 = 90 = 750 120 on Mead
3 = 80 to 64 — 74
4 · 60 to 50 not of the line
5 & 6. Frigates
Sloops, Out 2 3 2 D Gun
4 = 42 = 24 = 12 = 6 = 100
= 32 = 18 = = 9 = 74

Admirals — Subdivis
3 ranks — 3
— Blue White Red
Rear — Vice — Admiral —
— Flag when hoisted
— 3 Flag officers in a fleet
Signals —
— Day — night — Flags.
Rockets — Lanterns —
— Guns fired as a preparative

Magnetism
— Properties of the ~~Compass~~ Magnet —
1 attraction, long time
2. Polarity in the 13 or 14 Cent
3. Experiments —
4. Compass — Described —
5. Variation
6. Method of making magnets and touching needles —

Sailing —

— Ships a Globe —

— Long form — Lift resists against the head —

++ Terms on board

Head Stern — fore — off

Bow — quarter —

Starboard — Larboard —

+ Windward Leeward —

Weather bow — &c

— Sails in the wind's eye

+ on a wind or close hauled — Large —

— on the beam —

— on the Quarter best

— Wake — Lee way

+ Ships to windward bringing on to leeward to retire

3 ways

1 Bearing Directly down

— 20 : 1 against the attacking ship or 2 guns on the forecastle against 40 heavy —

X. Ships rigging — men and rigging more exposed

Disabled in her rigging before she gained a proper position for annoying her adversary — close action

2. Running down action into the wake — Parallel to the course — On equal terms — Bow chaser — Stern chaser

3. Shoot a head, ~~[illegible]~~ and run down on her weather bow, she will force her to bear away to leeward

+ Shot against the hull and Rigging.

1 Two Ships one to wind bearing down, the other to leeward fearing at her rigging disabled the lee ship either goes off or up to her adversary

— Comparative bulk of the Two objects — Rigging more than 20 times that of the Hull —

— Crippling a Ship enables her adversary either to come up with her or run away.

+ French fire at our rigging, we at their hulls —

+ At what distance one Ship can be fired on by 3 in line of battle —

1½ Cable = 360 yards the distance for one Ship to be fired on by 3 will be 1080 yards — ~~at~~ At two Cables length for position of quarter — × The Ship a head cannot bring her head near to the wind and consequently her broadside to bear on the single Ship × The Ship astern by bringing her broadside to bear could run to leeward and both could be exposed to be raked by their opponents in the line

× When our one Ship has sustained the fire of Nine at once she must have been at a great distance, or her line disordered —

To Dispute the wind
— Different methods of tacking
ship by shift, whole &
one.
— Line of battle a breast
a head — Bow and Quarter
+ Engagement described
+ Lee and weather line
compared —
+ Leading ships —
— Repeating frigate
where is the best station
of the Admiral? —

—.

Tacking — wearing
— for sail lore — bent —
gain — loose

Fleet
in three Division
— line abreast
— — a head
— Van — Center Rear —
+ Admiral ship —
+ Repeating frigates
+ Leading ships —

Line

Line a head close hauled

— Ships stations — yard

— cables length 120 fath: 240

+ Lee and weather Jaws

~~Lee~~ Lines

Determine the line

1 Double on the bars and

2. Lee incommoded by smoke

3. Lee line

1 Can fight their lower batteries —

2. Early move out of the line

Lee fleet cannot easily bring the other to action

— Manoeuvering

+ Tacking the whole fleet

+ Same as Depart Tacks —

Ship prepared

+

3. Throw its shot farther

1

× Springs on a cable —

Bulish – French attack
the whole – impossible
– Lacking line disabled
– Can receive the fire of the
whole line –

X New mode of attack
– Three Ships –

Sailing ~~~

– Mariners compass –
– points properly named –
+ Before the wind –
– Directly against the wind impossible –
+ within 6 points – sailing on a wind – Close hauled – Cutters and some frigates within 5 points ~
– Partly to the shape of the vessel – partly to the helm.
– Position of the sail oblique to the wind – Helm to windward
– Slowest when close hauled
– useful – necessary ~

Lee way quickest when close hauled — how determined —

+ Sailing large 1 point — wind on the beam — position of the sail —

— 3 points large or 1 aft the beam — 2 : 3 —

— 4 points or Quarter Ships sails best on this point — Sails not becalmed

— Before the wind — some of the sails don't draw —

— Tacking —

— A point to windward the ship cannot sail thro' to it — Tack — beat to windward —

— Starboard — Larboard course or tacks —

— Manner of tacking —

— fore sails shiver — impulse of the helm —

— Both tacks of equal length

+ If the sea runs high so as to make it necessary to reef the top sails the ship will make two points of Lee way and consequently will not arrive at her ~~height~~

Veering or Wearing
opposite to tacking —
turns her stern to wind.
— Manner of Veering —
bears away &c — sails
toward the stern until or
shiver while the fore sails
are spread —
— Loses ground more than
in tacking — seldom practised
except in cases of new sprung
Danger —
+ Bringing the vessel up to
the wind is called hauling
the wind —
~~the~~ hauled his wind and
stood off —

Fleet —
Sails in two or three col.
— mean together — can be soon
prepared for action —
— convoys — a frigate before —
+ Signals — flags hoisted
guns fired — rockets —
lanterns &c —
— Private signals — prin-
cipal is to know a strange
sail —

Line —

— The arrangement of a fleet of ships of war as corresponds to engage an enemy —

— Long line — a head — in the wake of each other

— 100 yards or cables length (240 yards)

— Advantage of this arrange. — sustain and support each other

+ Line close hauled is chosen this order extremely convenient

— as ships differ so much in ~~their~~ rate of sailing the distance would not otherwise be preserved —

— The sails in this position are so disposed as to assist each other by ~~their means~~ what

she neither advances nor retreats

— By this means they are enabled to retain their stations and prosecute the battle with vigor free from perplexity and disorder

+ Place of each division and each ship is previously determined —

— Two ships to lead on the Starboard and Larboard tacks —

+ Admiral in the center —

— advantages — Signals more easily seen — State of the fleet or enemy better observed —

+ Repeating frigate

Line abreast —

— Now formed on any point — this line is most commonly made use in convoys. in pursuing or retreating —

— abreast before the wind

+ From this to form the line a head.

* To tack a fleet

— two ways. this, by ships near an enemy dangerous — the weight double your van — Center rear —

— 2 All together — Bear away 4 points then tacks all at once — advantages of this

— when a ship is much damaged she cannot tack — wears — even if neither

she must be towed in tow —

‡ From the line a breast to form the line a head —

= Rule. Keep the wind two points on the quarter you mean to haul to Ex.

+ Wind at south — to form the line on the larboard tack

— two points on the Larb. quarter bring the main mast p.s W and E N E

— haul your wind and the ships are in a line a head on the Larb. tack.

Bow and Quarter line —

— To form the line ahead by the Bow and Quarter line on my Starboard tack

= Rule Keep the wind 2 points on the Starboard Quarter —

Main Mast Bears E & E and W S W — then haul to your Starb.d tack and the fleet will be in a bow and quarter line — Tack altogether and the line a head is formed on the starboard tack —

+ Strongest vessels in the Center —

Fleet brought to action —

— windward and leeward

+ Advantages of a Weather gauge —

1. Can determine the time of action

2. If more numerous may double the van or rear.

3. Little incomoded by their own smoke and not at all by that of the enemy.

4. Can dispatch fire ships.

— Disadvantages —

1. When the sea runs high cannot fight their lower guns

2. (Disabled) must tack to avoid falling into the enemies fleet.

— This sometimes impossible

3. More more exposed on the upper decks —

— Lee line

Advantages —

1 Can fight their lower guns

2. May have the opportunity cutting off part of the enemy — although it cannot double — it may oblige them to bear away.

3. Disabled ships more easily removed out of the line —

— Disadvantages

1 Cannot decide the time and distance of battle — It may consequently be attacked before it is prepared —

2. The enemy can bear down out of its line of battle

[illegible]

that the force of a single man could change its direction. —

That he saw it lay its broadside to a city and in a few hours reduce it to ashes &c — What credit would be given to such a relation? Now different is the estimate we form of the works either of nature or art when we consider them as single detached facts, and when we ~~view~~ have them through the various steps according to which they have arrived at their present pitch of improvement —

To give some account of the nature and effects of this wonderful machine is the intention of this lecture —

A machine so large and compl. must necessarily consist of a great variety of different parts — — — Names of the principle parts —

Rates

British Navy into six rates

	Men	Mar.s	L.	Pr.	
1	100	850	150	222	52 X
2	90	750	120		X 2162
3. 80, 64		650	100		Tons
4. 60	50				
5 & 6 Frigates					

	1 Pr.	2	3	4	
1.	42	24	12	6	100
3.	32	18		9	74
	32 or 24		12	6	64
		24	12	6	50
Frigates	9 Pr.				32
Sloops	6 Pr.				

Sailing —

Marinar compass —

— Points precisely named

were the vessel a Globe and

no helm she must always

sail before the wind —

— But from her shape — lies

resistance a head — helm —

can sail near the wind —

within six points — sailing

on a wind — Close hauled —

— Cutter fore within 5 points

— Position of the sails —

— 1 point large

2 wind on the beam

3 large Larking —

4 abeam the beam — Quarter

this the best sailing point —

— before the wind the sails dont draw

Terms

Windward — Lee ward —
Weather bow — Lee quarter
Starboard — Larboard —
Wake — Lee-way
observed —
I hauled my wind — bore
down — I steerned her lee
bow — thwart her hawse * for fore
Laid her on board the larboard
Quarter — Capt. Jervis —
Brake her fore and aft —
why this fire is more dangerous
board a midships —
Port the helm — Larboard —
Luff —

Tacking & Wearing

— A Point to windward — Ship
cannot sail directly to it
— Tack — Beat to wind? — Board
— How performed — you each bow
helm a lee or to port —
— In tacking her head is brought
across the wind —
+ Wearing — how performed
bear a way — After sails bore
— bear to avoid some danger — when
she cannot tack —
— In wearing her stern is brought
across the wind —
— In the former she is gaining in
the latter losing ground —

Anchoring — in
a stream wind and
tide — wind off — Down
Spring on the cable —

Admiral —

Three ranks of Admirals
— Blue — White — Red —
— Three subdivisions
Rear — Vice — Admiral —
— Order of Protection —
— Admiral distinguished by
his Flag — Red — White — Blue
— Admiral's flag — Main mast head
Vice Admiral fore mast — Rear
— + Three ~~Admirals~~ Flag officers
in a fleet —

1. Rear Admiral blue, White
red
2. Vice Admiral ~~red~~ Blue, White, Red
3. Admiral — Blue White ~~red~~
no red — Admiralty flag —

Fleet sailing

In three Division —
Center by the Admiral
Van by the Vice ad
Rear by the Rear ad —
sails in three part Line the
commander sometimes lead
at other times in the Center —
more easy communication of
the orders — signals better
observed — Convoy keeps to windd.
of the fleet — reason — frigate
on both sides — took out —

Signals —

+ Different flags hoisted on the same
part of the ship —
+ Same flag on different parts.
+ Gun — Rockets — Lantern —
+ Private signals —

Line —

Line a head — wake of each ov. up
Cables length = 120 fathm. 240
+ Line abreast
+ Bow and quarter line —
Line close hauled
~~The manner~~
— How to form the Line —
— Admirals place — reason
cannot see his own line —
+ Repeating frigate —
— Vice and Rear in the Center
of their own Division —
+ Leading Ships — Star. Larb.
— Fore sails and Jib — place
so as to conceal each oth.
— Mizzen top sail reserve

— Cutting the line —

+ Chasing — Pursuit —

× Ships to windward bring-
one to leeward to action

1st bearing down. 20 to 1
against the attacking ships
two guns for each against
40 — Ships raked —
~~rigging~~ disabled rigging

2. Running down astern into
the wake parallel to the
course — Equal terms —
Bow and Stern chases

3. Shoot a head twice and
run down on her weather
bow, force her to bear away
to leeward —

Hull and rigging 1 : 20
— Crippling a ship enables
her adversary either to com-
pel or run away
× French fire at our rigging
we at their hulls. —

+ Distance at which one
ship in a line can be
fired on by them at one
1½ cables = 360 yards ships opened
single ship 1000 yards at
least — Ship ahead not near

the wind — those astern
cannot bear away to leeward
for the rear would be ~~[illegible]~~
raked by one ship in enemy's
line —
— when one or two ships have
been sunk or lay three at
once the rear must have been
at a great distance or
her line disordered, better
+ Admirals place in the
center of the line — cannot
see his whole line
+ respecting frigate —
from ~~the~~ and to the admi
ral — opposite to the
middle of the line — each enemy

weather and lee gauge
— adv: weather gauge
1. Bear down begin the action
2. Double on the van or rear
3. less incom: by smoke-fire
— adv: lee line —
1. Fight lower deck guns.
2. Easily move out of the
line to repair. —
3. ~~[illegible]~~ men on the
upper deck less exposed

Single Ship on the lee bow finish her up.

Manoeuvring. —

2 modes of tacking
a fleet — Single Ships —
— all together — Examples
+ last time manoeuvring

Notes on Naval Tactics

Division of a Fleet into 3 Sq.
3 Orders of Admirals – Red.
White. Blue – Ad. of Fl.
carries the Union Flag at
M. T. M. next the White, Blue
Commanders of Division in
the rear – Comm.r of Sq.
in a sailing Frig.t Lead.
– Early form of Fleet 3 Par.
lines as near as possible
on any point from the wind
– Transp.t Je keep to windd.
more out of danger – been down
into the fleet – do not delay
in a retreat Tender fire shifts
stand to Leeward –

Batt: off the Texel 13 June 1665
Duke of York — Bin —

Leeward —

Wo:

1 Time of the action

2. If men numerous can double on the rear — rear of his Lee fleet almost useless in this respect

3. Send down fire ships —

4. Smoke — sparks of fire

Lewar

1 All ports open ~~2 Two for~~ adm Hawke 1759 20 Nov — confusion for water mists in

2. Early wore double ships

3 May more easily retreat —

Weather Gauge

1. Can determine the time of
2. Double on the Van or Rear
3. Less in cont.d by smoke
4. Dispatch fire ships

Disadvantages —

1 Can not open their lower ports —
2. Men more exposed
3. Must tack to cover the enemy

Lee line

— advantage

1 — Can fight their lower Port
2. Can easily repair their Dis— Greatly mann.d by smoke

Lee fleet cannot easily
bring the other to action —
— must wait for a change of
the wind or some over sight
of the Enemy —
+ Attack upon the same
tack — sometime different —
+ Inferior fleet cannot be
long in the presence of a
superior without being brought
to action — reason — Attack
* Battle of the Texel 1665
English two ships — line 15
miles — Duke — Prince Rupert
and Lord Sandwich —
from 8 till 2 o'clock — 20 Dutch
taken from the Dutch with
the loss only of one English
ship

Order of Retreat
— Half moon — Hawsers

— To Defend a fleet *
— To engage in a Cannot
— Spring on the Cable —
fixed sometimes to the ring
of the Anchor but more
commonly to the cable

* Bulk heads — —

Gunner — Stages — canni

To prepare the Ship

— up Hammocks —
Double advantage —
* Masts hoop the sails
— Yards reeved Boatswn —
— Carpenter shot plugs —
— Lieut. visit the Department decks
Orders beats to arms —
Marines are drawn up —
— Boatsw. piped all hands to
quarter — Boatsw.
— Guns run out — tackles
fast close — hatches lard
+ Red flag — Signal for battle
— Do not fire in broadside.

Greatest scene —
Remedi of the Canon —
Mast crashing of Mast
Fall of Mast — wreck of
ship — The Swarm of the Cyrus
Amidst such a scene before
the mind — Rousing order —
support and Mast — his
own time — favourable
moments shaken respid —
Glory — Country — Victory &c
Repeat. Story —

Comparative advantages
of Ship — and Battery —
— Gun of battery pointed
with more certainty than
ship Gun — Can be fired
~~with~~ more expeditiously —
— Ships can attack the weaker
part of a Battery can dete-
mine their distance — Shot
Bear can bearing more fair bear
can be returned, fair from
the tops —
— If the Cable is shot away
the ship may be exposed
to be raked by the battery
— If the tide changes the ship
is exposed for a short time
to be raked unless she is
moved both head and Stern

[illegible] has a spring on her
[illegible] —

23 Dec[illegible] —

7 lb 2 sh —