

Original

10 March 1994

ADDITIONAL MARINE LOG BOOK DATA
1936 to 1948

INTRODUCTION

1. The statement of requirement is at annex A.
2. This contract is to examine ships meteorological records in the archives at Bracknell and Public Records Office Kew, to see whether all data had been transferred to the Marine Data Bank at the Meteorological Office.
3. Interest is focused on three specific periods where data is short, 1854 to 1900, 1910 to 1920 and 1936 to 1948. This report covers the latest period 1936 to 1948.
4. The archives hold four types of marine recordings:
 - Warship Meteorological Log Books - there are 812 covering this period in the archives at Bracknell.
 - Merchant Ship Meteorological Log Books - there are 3,795 covering this period in the archives at Bracknell.
 - Merchant Ship Met Forms - there are 10,887 covering this period at Bracknell.
 - Warship Deck Logs - there are 27,661 covering this period at Kew.

MARITIME ACTIVITY 1936 to 1948

5. The logs clearly illustrate maritime activity at that time and reaction to world events.

Warships

6. In 1936 the Fleet was supporting British interests in:
 - A. China Sea based in Hong Kong.
 - B. East Indies based in Singapore.
 - C. Indian Ocean based in Trincomalee, Ceylon.
 - D. Mediterranean based in Malta and Gibraltar.
 - E. South Atlantic based in Simonstown, South Africa.
 - F. West Indies and Western Atlantic based in Bermuda.
7. The nineteen thirties were enjoyable years in the Navy, gunboat diplomacy and political strategy required sea power to be seen, not out of sight, at sea. From 1936 to 1940 warships spent a large proportion of their time in harbour. Regulations required Naval Officers to work onboard only when duty required. Sporting facilities were extensive and travel devoid of bureaucratic restrictions. Base ports attracted 'the fishing fleet', unattached daughters sent to visit relatives, friends or parental contacts to 'catch' an eligible husband. When ships did venture out for spring or autumn exercises they visited the same standard ports on station. The 'fishing fleet' followed. Meteorological observations pre-war repeatedly cover much the same ground.
8. By 1940 the pattern of Naval activity had changed dramatically

warships were redeployed to protect essential seaborne supply routes and the convoy system was underway in earnest. The next two years give a wealth of meteorological observations. The bulk of observations came from smaller escorts and Armed Merchant Cruisers continually at sea protecting convoys. Capital ships left their defended anchorages, normally only to take transit or engage in set battle pieces.

9. Towards the end of the war and post war years warship activity returned in strength to the Indian and Pacific Oceans.

Merchant Ships

10. Trade pre-war extended world wide with regular traffic eastwards to the Middle East, Far East and Australasia. Westwards and southwards trade flourished with South Africa, South America, Canada and The United States east and west coasts. Whaling ships brought observations from southern latitudes.

11. Observations ceased from all merchant ships during the war years but resumed afterwards and by the end of 1946 were back to previous levels of reporting in former trade routes.

METEOROLOGICAL LOG BOOKS

Warship

12. Large warships or the senior ship of a squadron carried qualified Meteorological Officers from the Instructor Branch of the Royal Navy. Observations were from precision instruments carried by these ships.

13. Annex C shows an example from a typical log. Met Officers did not normally take observations during the hours of darkness and therefore most logs record observations only three times a day usually 0800, 1200 and 1800. However some logs do contain considerably more observations than this normal standard, as shown in annex C1.

This reduces their usefulness.

14. It is clear that sometimes other duties conflicted with meteorological observations and in one Log the Met Officer records his frustration with conflicting demands between being Flight Deck Officer controlling movement of aircraft and taking his readings.

15. Quantity varies greatly. VALIANT's log volume 8 is an example of a log with a large amount of excellent information; photographs of clouds, copies of weather forecasts, barograph papers, accounts of windfinding by shell, records of upper air temperature and diagrams of weather maps as well as standard observations.

16. There are some interesting accounts of how the weather affected actions with the enemy (an example is at annex G). Occasionally something of more general met interest is recorded. BERWICK Mar 39 Log includes a cutting from the Times recounting the loss of Empire Flying boat The Cavalier, with three lives, due to icing in the carburettors.

17. Annex H shows a page from SUFFOLK's log S9 with an account of a lunar rainbow.

18. 1,042 Warship Met Log Books from the archives at Bracknell were examined, 812 covered the period of interest. The Data Bank lists HM ships under series number 204 and log book number 32768. In the archives each ship has its own archive code i.e. AJAX - 'AX1' 'AX2' etc.

19. Examination of each log book showed not all observations had been keyed. The policy appears to have been to take only 3 or 4 for each day whatever number was available. It is estimate that some 15,000 extra observations could be found if all available observations were now required. Annex B shows where these log books are stored in the archives.

20. Only 8 logs had not been keyed at all. Three because of lack of geographical positions but it was not evident why the others had not been keyed.

21. The number of observations keyed are pencilled in the back cover of each log. Researches showed:

101,872 observations noted as keyed
95,499 observations listed by the computer as keyed
6,373 unaccounted

Merchant Ships

22. A proportion of merchant ships join the VOF (Volunteer Observer Fleet) either by invitation from the Met Office or by the shipping company volunteering its services. Vessels are supplied with precision instruments from the Met Office and a Meteorological Log Book. Records from these observations are recorded in the Data Bank under the heading of 'selected ships'.

23. Annex D shows an example of a Merchant Ship Meteorological Log. Annex B shows where they are stored in the archives. 3,795 log books were examined. The Data Bank lists these under series 203, 205 and 207. All observations had been keyed, under log numbers 19020 to 19279 for the period 1936 to 1939, and 1 to 3536 for 1945 to 1948.

METEOROLOGICAL FORMS

24. Non selected merchant ships or Auxilliary Reporting Ships as they are known by the Met Office Marine Branch, record observations on 'Met Forms', a single sheet of paper allowing four sets of observations each day. An example is at annex E. These ships use their own instruments supplied from company sources.

25. 10,887 Met Forms covered the period with archive log numbers from 33757 to 44644. Only the Met Forms after the war years, numbers 43001 to 44644 had been keyed. Numbers 33757 to 43001 contain data for the period of interest and have not been keyed. This gives some 520,000 observations available to add to the Data

Bank. Annex B shows where they are stored in the archives.

26. In addition, a bunch of loose Met Forms were discovered, forwarded by Australian and New Zealand Merchant Ships sailing the Pacific and Indian Oceans between 1945 and 1948. Met Forms had been keyed but W/T transmission forms from other ships but not accompanied by a Met Form, had not. This latter source could yield some 3,000 additional observations mostly from the southern hemisphere to add to the Data Bank.

DECK LOGS

27. Warship deck logs are forwarded to the Public Records Office at Kew when they are completed. Merchant ship deck logs reside in shipping company offices and are not kept by all companies.

28. Weather observations are recorded at the end of each watch at sea: 0400, 0800, 1200, 1600, 1800, 2000, 2359. The geographical position of the ship is recorded three times daily: 0800, 1200, 1600. An example is given at annex F.

29. 27,661 Deck Logs covered the period of interest, archive numbers 100697 to 128358, all were examined. None of the observations had been keyed into the maritime data bank.

31. Some 290,000 observations with geographical positions are available from Deck Logs to add to the data bank. If the ship's position were interpolated between 1600 and 0800 to give all 'end of watch' observations a geographical position, a total of some 600,000 new observations could be keyed into the data bank.

32. This calculation does not include observations from Deck Logs where a Meteorological Log Book was kept and the data has been keyed.

MARITIME DATA BANK

33. Checks of all types of logs with data already recorded in the data bank showed an average of 8% keying errors in transferring data. The most frequent error being in changing local time to Greenwich Mean Time. All logs at sea are kept in local time. Most errors were small but errors crossing midnight could lead to a 24 hour error if the time was changed but not the date.

SUMMARY OF OBSERVATIONS AVAILABLE

34. The following observations could be added to the Data Bank:

Warship Met 6,373 noted in the back of the log book as keyed
Log Books but not found in data bank.
(Bracknell) 15,000 not keyed as sufficient data was keyed at
the time.

Warship Deck 290,000 not keyed at all. 600,000 if ship's position
Logs is interpolated.
(Kew)

Merchant Ship
Met Forms 520,000 not keyed at all.
(Bracknell) 3,000 Australian & New Zealand

Total 834,373 or 1,144,373 if ship's position is interpolated.

Additional Data expressed by global area:

Log	Atlantic		Med	Indian Ocean		Pacific	
	North	South		North	South	North	South
Warship Met Logs	45%	5%	22%	12%	8%	5%	3%
Warship Deck Logs	43%	6%	16%	17%	9%	6%	3%
Merchant Ship Met Forms	30%	25%	15%	11%	10%	6%	4%

QUALITY

35. Met Log Books were completed by specialists in the field of meteorology. Observations were of good quality taken from precision instruments. Notes on instrumentation are in the front covers. Annex C2 shows notes from a warship. Annex C3 is a particularly interesting report from a Met reporting officer typical of reports sometimes included in logs early in the period.

36. Their logs were assessed in the Royal Navy's case by the Director Naval Meteorology and given a grading, annex C4 is an example of the certificate attached to the log before forwarding to the Met Office. The Met Office's own Marine Branch assessed Merchant Ship Met Log Books with a certificate attached to the log as seen in annex D1. A VOF officer achieving 18 years high standard of reporting received a presentation barograph. This custom continues today.

37. Observations in Deck Logs and Met Forms have been made by professional Mariners but with ships instrumentation. Nevertheless, the quality is considered satisfactory by the Met Office Marine Branch. Instruments are frequently checked by Port Meteorological Officers world wide in an internationally linked VOF organisation.

38. Deck Logs were kept in 'rough' throughout this period and neatly copied in ink in the fair log the following day by the Navigating Officer or his assistant. A small number of copying errors may therefore have been made. Wind speed and direction would be estimated by looking at the height and direction of the waves. An experienced eye would give +/-10 degrees and +/-5 knots accuracy. Barometric, wet and dry readings would be from portable instruments, sea temperatures from engine room intakes.

39. Both the Merchant Service and the Royal Navy had allowances paid above and below specific temperatures. The Royal Navy gave

free issues of 'limers', a popular thirst quenching scurvy deterrent drink, in tropical climates. However, whilst there may have been incentives to adjust readings, 'Pussers' of the Royal Navy and 'Pursers' of the Merchant Marine, who accounted for these perks guarded the public or company purse with greater fortitude than their own. The legal status of deck logs and accuracy were respected.

40. Quality standards are assessed as:

Meteorological Log Books - completed by warship and merchant ships using precision, well calibrated instruments accurately read and recorded.

Deck Logs and Met Forms - completed by ships using their less precise instruments satisfactorily calibrated accurately read and recorded.

KEYING COSTS

41. Costs would depend on the ease and speed of extracting the data. An assessment is as follows:

Met Forms - Single sheets that could be temporarily removed in their boxes from the archives at Bracknell, to be processed at a site convenient to the contractor. This should reduce the time and cost factors.

Warship Deck Logs - Cannot leave the archives in Kew. Limited space and access for the contractor increasing time and cost.

Warship Met Log Books - Could be temporarily removed from the archives at Bracknell to reduce cost and time.

RECOMMENDATION

42. It is recommended that:

A. Met Log observations 6,373 are disregarded as too time consuming and costly to resolve.

B. The following observations be keyed into the data bank in the priority order:

a	Merchant Ship	520,000
	Met Forms	3,000
b	Warship Deck Log	600,000 with interpolated positions
c	Warship Met Log	15,000
	Total	1,138,000

I agree since a) is cheapest and c) are only daytime.

43. It is possible to increase the 585,599 observations in the Data Bank threefold, if the recommendations are implimented.

OTHER SOURCES WORTH INVESTIGATING

44. Marine observations are also held by the following:

A. Hygrographic Office Taunton - HM Survey ship Deck Logs.

B. Defence Research Agency - sea temperature gradients.

C. Hydrographic Office Taunton - Surface ship, submarine and maritime aircraft bathythermograph records.

D. Engine Room Registers kept at MOD(Navy) Bath.

E. Merchant Ship Deck Logs held by shipping companies.



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Management Information Services
10 March 1994

Annexes: A. Contract Requirements.
B. Plan of Bracknell Archives.
C. Sample of a Warship Met Log Book page.
C1 Sample of a second style of Warship Met Log.
C2 Notes on warship instrumentation.
C3 Warship Met Officer's report.
C4 Director of Naval Met certificate of inspection.
D. Sample of a Merchant Ship Met Log Book page.
D1 Met Marine Branch certificate of inspection.
E. Sample of a Merchant Ship Met Form.
E1 Reverse side of Merchant Ship Met Form
F. Sample of a Warship Deck Log page.
G. Weather and enemy action.
H. Lunar rainbow.
I. Genuine 1937 'Fag end'(original report only).

Specification of requirements for identifying sources of additional Marine Logbook Data.

1. Background

It has been shown from listings of ship numbers and call signs in the Marine Data Bank that certain Logbooks in the Meteorological Office Archives have not been keyed.

Some of the Logbooks, not keyed, have a unique character presentation to describe the wind direction. These records cannot be found in the digitised data bank and it seems probable that many years ago a decision was taken not to key these data.

The Met. Office holds about 600,000 Meteorological Logbooks from Royal Navy and Merchant ships. A preliminary search of the Public Records Office at Kew identified 160,000 Navy Logbooks (Captains Logbooks). Most Naval ships have two Logbooks - Captains Log and the Met. Log. It is necessary to know if the meteorological records at Kew are duplicates of the records in the Met. Office. The largest proportion of these Logbooks record data from 1950 onwards, but there are significant numbers back to 1854.

Preliminary comparisons of observations made at the same time in the Captains Logbook and Meteorological Logbook occasionally show significant differences in instrumental readings.

The Met. Office Logbooks are catalogued in ship and time order and there is a comprehensive index which describes Ship names, routes and times for all ships logbooks. The indexing of the records in the Record Office at Kew is no as comprehensive for early years, but after 1939 the logbooks are grouped by year and ship.

The years before 1900 and the War years - 1911 to 1920 and 1936 to 1948 are noticeably short of data in the Marine Data Bank and it is possible that observations from these times are only available from the Navy Logbooks archived at Kew.

There is a great deal of international interest in finding additional sources of marine meteorological data. In particular the USA's National Climate Data Center (NOAA) is very keen to obtain as many data as possible to enhance the Comprehensive Ocean Atmosphere Data Set - COADS. The Met. Office as part of WMO has a commitment to assist in the search for additional data.

A contractor will be employed to key the observations from the Logbooks, if significant numbers of additional data are found.

2. Requirements

The Archives at the Met. Office and at Kew are to be searched for meteorological observations which have not been copied to the Marine Data Bank. Logbooks are to be categorised so that a proper assessment can be made as to whether any additional data discovered should be keyed and added to the Data Bank.

The following routine will be used to categorise the Logbooks.

In the Met. Office Archive.

2.1.1 A list of the Logbook numbers contained in the Marine Data Bank will be made available. The shelves should be searched, and Logbook numbers not on the list of keyed books should be noted as "Not Keyed".

2.1.2 The number of observations keyed from each Logbook in the Marine Data Bank will also be made available and this should be compared with the number of observations in the Logbook in the Archive. If only part of a Logbook has been keyed, the Logbook should be noted as "Part Keyed". Otherwise the Logbook will be noted as "Keyed"

2.1.3 "Not Keyed" and "Part Keyed" Logbooks will be further classified to indicate whether additional data are worth keying. This is a learning exercise and the decision will be made initially by Mr Jackson and the scrutineer, after examination of the logbooks.

2.1.4 Logbooks which contain the wind direction as a diagram should be identified as containing "Wind Characters".

2.1.5 If there are any further classification problems, they should be discussed with Messrs Jackson and/or Parker.

2.1.6 The number of observations and the numbers of logbooks containing observations to be keyed are to be grouped into years and Ocean areas - North Pacific, South Pacific, North Atlantic, Indian Ocean.

At the Public Records Office, Kew.

2.2.1 The observations should be compared with observations in the Marine Data Bank. Listings of observations from the Data Bank will be available for comparison.

2.2.2 Methods of making the observations should be noted.

2.2.3 Significant differences between observations made at the same time should be noted.

2.2.4 The ships position is given only three times in the day in the Captains Logbook. It will be necessary to find a method of obtaining the position when an observation is made.

2.2.5 The number of observations and the numbers of logbooks containing observations to be keyed are to be grouped into years and Ocean areas - North Pacific, South Pacific, North Atlantic, Indian Ocean.

DUCT

Ä	B̄	Ĉ	D̄	Ē	F̄	Ḡ	H̄	J̄
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G09C

J	H	G	F	E	D	C	B	A
A	B	C	D	E	F	G	H	J

G07G08

SB106

J	H	G	F	E	D	C	B	A
A	B	C	D	E	F	G	H	J

G05G06

J	H	G	F	E	D	C	B	A
A	B	C	D	E	F	G	H	J

G03G04

J	H	G	F	E	D	C	B	A
A	B	C	D	E	F	G	H	J

G01G02

J	H	G	F	E	D	C	B	A
A	B	C	D	E	F	G	H	J

J05J06

AREA J

J	H	G	F	E	D	C	B	A
A	B	C	D	E	F	G	H	J

J03J04

J	H	G	F	E	D	C	B	A
A	B	C	D	E	F	G	H	J

J01J02

H11H10

J
A

H09H08 ARC

J
A

H07H06

J
A

H05H04

J
A

H03H02

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5 ICE

DUCT

DUCT

Warship Met Log Books

Merchant Ship Met Log Books

Merchant Ship Met Forms

1936 - 1968

METEOROLOGICAL INSTRUMENTS ON BOARD.

BAROMETER.

Maker's Name and M.O. No. *Caldarara 2364/30*
 Height of Cistern above Sea Level *15'*
 Standard Temperature *28.54 A at 10.00 mb*
 Position *Captains Cabin - upper deck*

BAROGRAPH (Open Scale).

Maker's Name and M.O. No. *Shat and Mason 87/34*
 Position *Plotting Room - Lower Bridge*

THERMOMETERS FOR AIR TEMPERATURE.

	Date	Date	
		from	to
Dry—Maker's Name and M.O. No. <i>Caldarara 34867/35</i>			
Wet—Maker's Name and M.O. No. <i>Caldarara 34067/33</i>			

Height above Sea Level of Deck from which Observations are made *15 ft. on Q.D. in harbor. 40 ft. on Lower Bridge at sea.*

ELECTRIC PSYCHROMETER.

Maker's Name and M.O. No. *Casella 72/34*

Height above Sea Level of Deck from which Observations are made

Date	Date	
	from	to

THERMOMETER FOR SEA TEMPERATURE.

Maker's Name and M.O. No.

Date	Date	
	from	to

THERMOGRAPH (Distant Reading).

Whether Dry and Wet Bulbs or Dry Bulb only *Wet and dry bulbs*
 Maker's Name and M.O. No. *Neyutti and Zambra 27/35*
 Position of Bulbs *on fore side of Crow's Nest in lowered screen*
 Height above Sea Level *92'*
 Height above Recording Instrument *5'*
 Length of Capillary Tubing (Single Length) *approx. 75'*
 Distance of Bulbs from Funnel *33 1/4'*

WIND DIRECTION AND SPEED RECORDERS.

Direction Recorder—Maker's Name and No.
 Speed Recorder—Maker's Name and No. *Munro 523*
 Position of Vane *on fore top mast, 9 ft. above Crow's Nest*
 Height above Sea Level *96'*
 Diameter of Pressure and Suction Tubing *1/2"*

METEOROLOGICAL OFFICE.

Position *Plotting Room on Lower Bridge*
 Size *14 ft. x 6 ft.*

REMARKS.

Entries marked with a red cross X are read and made by the Met. Officer himself. The remainder are taken from the Deck Log, and may not be very accurate. Barometer readings from the latter are entered to the nearest mb. Entries in red are on next page, on right hand page.

THE BEAUFORT WIND SCALE.

Beaufort Number International.	Speed of wind in Knots at a height of 33 feet.
0	Less than 1
1	1—3
2	4—6
3	7—10
4	11—16
5	17—21
6	22—27
7	28—33
8	34—40
9	41—47
10	48—55
11	56—65
12	Above 65

In a steamer the force of the wind may be judged by an experienced observer by the appearance of the sea, remembering that rain has a smoothing effect, and tidal streams or currents influence the sea surface differently when there is a weather or lee tidal stream or current.

DOUGLAS SEA AND SWELL SCALE.

SEA.	SWELL.									Confused.	
	No Swell.	Low.			Moderate.			Heavy.			
		Short or Average.	Long.	Short.	Average.	Long.	Short.	Average.	Long.		
0 Calm ...	00	01	02	03	04	05	06	07	08	09	
1 Smooth ...	10	11	12	13	14	15	16	17	18	19	
2 Slight ...	20	21	22	23	24	25	26	27	28	29	
3 Moderate ...	30	31	32	33	34	35	36	37	38	39	
4 Rough ...	40	41	42	43	44	45	46	47	48	49	
5 Very Rough ...	50	51	52	53	54	55	56	57	58	59	
*6 High ...	60	61	62	63	64	65	66	67	68	69	
*7 Very High ...	70	71	72	73	74	75	76	77	78	79	
*8 Precipitous ...	80	81	82	83	84	85	86	87	88	89	
†9 Confused ...	90	91	92	93	94	95	96	97	98	99	

NOTE.—In this scale a new departure has been introduced in that length of swell and height of swell are, from the point of view of observations, considered separately and then combined together for coding.

A *Short Swell* means a Swell where the length or distance between each successive top of swell is small.
 A *Long Swell* means a Swell where the length or distance is large.
 A *Low Swell* means a Swell where the height between the lowest and highest part of the swell is small.
 A *Heavy Swell* means a Swell where the height is great.

*These are considered to represent seas which occur with a swell or in the open ocean, for instance, the highest sea recorded in sheltered waters would be 5, or under exceptional circumstances (e.g., a hurricane) 6 or 7 might be used. The idea of the roughness would be conveyed by the force of the wind.

†Occasioned by current, tidal stream, sudden shift of wind, and not necessarily strong wind.
 The above scales for sea and swell have been adopted separately for international use in weather reports.

TABLE FOR FINDING RELATIVE HUMIDITY.

Dry Bulb. °F.	Depression of Wet Bulb.												
	0°	1°	2°	3°	4°	5°	6°	7°	8°	9°	10°	11°	12°
90	100	96	92	88	84	81	77	74	70	67	63	60	57
88	100	96	92	88	84	80	77	73	69	66	63	59	56
86	100	96	92	88	84	80	76	72	69	65	62	58	55
84	100	96	92	87	83	79	76	72	68	64	61	57	54
82	100	96	91	87	83	79	75	71	67	64	60	57	53
80	100	96	91	87	83	79	74	70	66	63	59	55	52
78	100	95	91	86	82	78	74	70	66	62	58	54	50
76	100	95	91	86	82	78	73	69	65	61	57	53	49
74	100	95	90	86	81	77	72	68	64	60	56	52	48
72	100	95	90	85	80	76	71	67	63	58	54	50	46
70	100	95	90	85	80	75	71	66	62	57	53	49	44
68	100	95	90	84	79	75	70	65	60	56	51	47	43
66	100	95	89	84	79	74	69	64	59	54	50	45	41
64	100	94	89	83	78	73	68	63	58	53	48	43	39
62	100	94	88	83	77	72	67	61	56	51	46	41	37
60	100	94	88	82	77	71	65	60	55	50	44	39	34
58	100	94	88	82	76	70	64	59	53	48	42	37	31
56	100	94	87	81	75	69	63	57	51	46	40	35	29
54	100	93	87	80	74	68	61	55	49	43	38	32	26
52	100	93	86	79	73	66	60	54	47	41	35	29	23
50	100	93	86	79	72	65	59	52	45	38	32	26	20
48	100	92	85	77	70	63	56	49	42	36	29	22	16
46	100	92	84	77	69	62	54	47	40	33	26	19	—
44	100	92	84	75	68	60	52	45	37	29	22	16	—
42	100	91	83	74	66	58	50	42	34	26	18	—	—
40	100	91	82	73	65	56	47	39	30	27	—	—	—
38	100	91	81	72	63	54	44	39	31	22	—	—	—
36	100	90	80	70	60	54	44	35	26	18	—	—	—
34	100	90	79	70	60	50	41	31	21	—	—	—	—
32	100	89	79	68	57	47	36	27	17	—	—	—	—
30	100	88	76	65	53	43	33	22	—	—	—	—	—

A capital letter denotes "Intense" or "heavy," e.g., R=heavy rain. Repetition of a letter denotes "continuous," e.g., RR=continuous heavy rain. Addition of suffix O to a letter denotes "slight," e.g., fo fo=continuous slight rain.

-2-

Appendix to "Ajax" letter No. 19 dated 12th October, 1935.

REPORT ON METEOROLOGICAL WORK - H.M.S. "AJAX".

Meteorological Organisation in "Ajax".

No Meteorological Office has yet been constructed but the Meteorological Officer has been given the use of the Plotting Room when not required as such, and he is usually able to work there undisturbed.

No Pilot Balloon Shelter has been provided. The hydrogen cylinder in use is kept underneath the Catapult Platform, and the balloon is filled abaft this platform. In light winds this can be done reasonably accurately, very little final adjustment being required in a sheltered position, but with strong or beam winds, it is found that a considerable amount of hydrogen is wasted, due to being unable to estimate when the balloon is correctly filled.

The Meteorological Officer has been given the part-time assistance of an Able Seaman from part of Ship, who has been taught to plot the synoptic charts and to look after the care and maintenance of the various instruments.

Supply and Erection of Instruments.

H.M.S. "Ajax" was constructed at Barrow-in-Furness, and on being taken over by the Admiralty had been supplied with the following instruments:-

1. Mercurial Barometer - in the Admiral's Lobby.
2. Distant-reading Thermograph - on the fore side of the Crows Nest with the recorder in the Chart House (by Admiralty specification).
3. Barograph - in the Chart House.

After commissioning at Portsmouth, the remainder of the Meteorological instruments (pilot balloon outfit, Assmann Psychrometer, strut psychrometer, aeroplane aneroid etc.) were supplied on demand.

The open scale barograph and Munro Wind Speed Recorder, graduated to 80 knots, were not supplied until very shortly before leaving for the Mediterranean, and no time was available for their erection then.

On arrival at Malta it was arranged that the Dockyard should erect the Wind Speed Recorder. A consultation took place between the Dockyard, a representative from the Malta Meteorological Office and the Ship's Meteorological Officer as to the most suitable place for this. The Anemometer Head was erected on a bracket on the fore side of the fore top - mast with the Recorder in the Plotting Room. The disadvantage of this position is that if it is required that the top-mast be struck, it will also be necessary to first remove the wind vane, etc. This is not very satisfactory in view of the fact that the top-mast is so designed as to be enabled to be struck rapidly. The Dockyard representatives though, were of the opinion that this would have to be accepted, due to lack of alternative positions. They were not prepared to extend the bracket on which was mounted the Gunnery Wind Recorder, or mount it on top of the Crows Nest, which positions were preferred by the Ship's Meteorological Officer.

/Opportunity

-3-

Opportunity was also taken whilst at Malta of mounting the open scale barograph on the athwart ship bulkhead of the Plotting Room.

Assistance was given by the Malta Meteorological Office in setting up the recorder and seeing that it was functioning correctly when the work was completed.

REMARKS ON INSTRUMENTS.

Munro Wind Speed Recorder.

This instrument was mounted on the athwart-ship bulkhead of the Plotting Room, being the only position suitable without reorganising the lay-out of the other instruments already there. No trouble has been experienced in the siphon pen losing suction due to movement of the ink in the trough (vide Periodical Letter 9/35, received since). It has been found, however, that the ink in the trough is inclined to overflow in even quite moderate rolls, of say 10°, and run all over the chart.

The D.R. Thermograph and O.S. Barograph have been mounted athwartships.

Distant-Reading Thermograph.

On many occasions it has been found that the muslin and wick on the wet bulb have become dry long before anticipated. In the 'Notes' issued with the instrument, it states that 'the muslin should be changed once a week, or more frequently if there is reason to believe salt spray has blown over it'. This routine was carried out at first, but it has been found in practice that the muslin sometimes becomes dry in two days and sometimes it lasts as long as a week. A decrease or an increase in relative humidity appears to have little effect. At present, the routine is to change the muslin every two days.

Electric Psychrometer.

This instrument has not been used to any great extent, due to the time taken in setting the instrument up and obtaining the necessary readings.

Daily Routine, Forecasting, etc.

Whilst at Malta, the Meteorological Officer was disembarked at Calafra, and no organised meteorological routine was carried out until the ship sailed for the West Indies.

On arrival on the America and West Indies Station, the two Arlington Reports were plotted daily, other circumstances permitting. Very little information was available for the area in which the ship then was. Consequently, forecasts issued were not very reliable, and were only of a general character.

The ship returned to the Mediterranean at the beginning of September. Owing to our other W/T commitments, Rhella synoptic reports only have generally been read. While stationed in the Eastern Mediterranean, forecasts have not been issued unless more information has been available or when reliability could be placed on them.

/Owing

Owing to his other work in the ship, the Meteorological Officer has not been able to insert the necessary information regularly in the Meteorological Log, or at regular times. On most days though, the Meteorological Officer has logged two observations himself (marked with a red cross), the remainder being copied from the Deck Log.

No weather of extraordinary interest has been experienced. The synoptic charts of August 20th - 23rd and September 1st - 7th show the path followed by two tropical disturbances in the West Indies and North American Waters, the latter doing considerable damage in the vicinity of Key West. The wind speed autographic record from September 18th - 20th shows clearly the gustiness experienced by a ship at the Detached Mole at Gibraltar during a Levanter.

During long sea passages a pilot balloon was sent up daily as a routine.

No attempt was made to put in the fronts on the chart owing to their being such a long distance away from the ship.

Method used for Pilot Balloon Observations.

The two Searchlight Sights on the Fore Bridge, stabilised for azimuth and elevation, and fitted with Barr and Stroud binoculars are used for following the pilot balloons. The Sight on the weather side is trained on approximately the reciprocal bearing of the balloon, and is layed on the horizon. At the moment of each observation, the angle of depression or elevation due to ship's roll is read off, and subtracted or added to the elevation observed. This method has been used in quite moderate rolls, and good results have been obtained, no smoothing out of the curve being required in the majority of the cases.

If the balloon crosses the ship, it is necessary of course to cross over from one sight to the other. The delay caused has to be accepted, but not more than one observation should be missed.

A personnel of three only is required for this method one at each sight and a Timekeeper, who acts as recorder and also reads off the observed Elevation and Bearing.

H. 243 (late s. 329). (Established November, 1928.)
(Revised March, 1934.)

H.M.S. AJAX.

Station American and West Indies.
South American Division.

Abstract of Ship's Meteorological Log in Naval Division
Meteorological office
Station American & West Indies
(S. American Division) Class of Log A
Ship H.M.S. "AJAX" 6
Meteorological officer Lt. (O) R.T. Shaw, R.N.
Period covered by Log 7.11.36 - 3.2.37.
Ports visited Valparaiso, Juan Fernandez, Puerto Corral,
Puerto Montt, Pt. Yates, Alert Harbour, Wide Bay, Port
Famine, Magallanes, Port Stanley, Falkland Isles,
Grytviken (S. Georgia), Buenos Aires.

METEOROLOGICAL LOG

for H.M. Ships.

Period 7th November 1936, to 3rd February 1937.

Date	Position	Weather of special interest
12.11.36	Valparaiso	Thick fog.
29.12.36.	51.0°S., 61.1°W.	4° fall in sea temperature and decreased visibility.
8.1.37 - 11.1.37	Falkland Is. to S. Georgia	Ship steaming in a depression.
11.1.37.	53.7°S., 37.6°W.	Fog, icebergs.
17.1.37.	54.1°S., 45.2°W.	Thick fog 0630 - 0745.

- Pilot Balloon Ascents
- Upper Air Temperatures
- Records of O.S. Barograph. D.R. Thermograph. Wind Speed Recorder.
- ~~Synoptic Charts~~ *Remarks on Synoptic MESSAGES*
- Forecasts *- Single Observes*
- Ship Reports
- Photographs *Aircraft operation. C.A.F.O. 2739/36*

D 31326-1 - 100 C F

DATE.

From	To

Meteorological Officers R. T. Shaw. dirat: (O).

Commanding Officer *[Signature]*

Meteorological Log kept on board

S S Rhescenor

Captain R. B. Neville from Los Angeles to Manila.

Meteorological log table with columns: DATE, Latitude, Longitude, Current when determined at short intervals, Course and Distance, Wind at the time of observation, Barometer, True Atmospheric Pressure at Sea Level, Thermometers (Dry, Wet), and Remarks.

* Please give Readings of the Ship's Barometer, say at Noon, at various times during the voyage noting whether it is mercurial or aneroid

See last page of log

Meteorological log table with columns: Clouds at time of observation, Weather at time of observation, Sea Surface (Waves, Swell), and Remarks. Includes detailed cloud and weather observations.

so that in the event of the Office Barometer being broken the Ship's can be taken into use and its error can be ascertained.

before commencing.

04125
126

090

091

092

Rain-fall by Gauge. 08/5 mm.

09/5

10/5

09/5

09/5

A. M. FORM 953

T.S. 118

A.M. FORM 953

FORM FOR TESTING LOGS. Examined 27th October 1936

When this Log is sent into the Meteorological Office at the end of a voyage, demand should be made for all requirements for the next voyage.

How was the screen containing the dry and wet bulbs situated? Screen portable + moved to weather side prior to observations

If screen is portable and moved to weather side before observations are taken, this should be clearly indicated here.

Where was the Meteorological Office barometer located? On Boat House Bulbhead

Height of Rain Gauge above Sea Level? _____ feet.

In the space marked—Names of Observing Officers—the names of all those who have assisted in keeping the Log should be noted.

FOR OUTWARD PASSAGE.

Was the Ship's speed measured by Log or Revolutions? Revolutions

State of Loading, Light or Deep? See first page of each passage

Was the Propeller immersed? _____

FOR HOMEWARD PASSAGE.

Was the Ship's speed measured by Log or Revolutions? _____

State of Loading, Light or Deep? See first page of each passage

Was the Propeller immersed? _____

General Remarks as to reliance which may be placed on current observations:—Currents are whenever possible worked between reliable Stellar or Solar Observations

No. of Log Character.	19092			No. of Days' observations	71
Date.	For whole of Log	29 April 1936	Ending	7 August 1936	
Nature of Voyage.	From	Cabool	To	Durban, Dakar, New York, Montreal, Ballas, Los Angeles, Manila.	Observers: P. Dunnic, J. J. Jones, J. E. Tarrill
Captain.	R. C. Hewitt		Ship. "Rhexenoi"		
Barometer.	No.	334	Height of Cistern	46 feet.	
Thermometers.	Sea Surface No.	31924	Dry Bulb No.	31413	Wet Bulb No. 32355
Hydrometer.	No.	1274			
Entries.	Character.	Are there too many entries of "Do." instead of observations?		No	Correctly dated? Yes
Ship's Positions.	Character.	x	Are observed and D.R. positions given throughout at Noon? Yes		Positions omitted? None
			At other times when short period currents are given? Yes		
			Do positions appear trustworthy? Yes		
Currents.	Character.	x	Given in log for 24 hours? Yes	Are data regularly given? Yes	Was Pt. Log used or Revs.? Revs.
			" " short intervals? Yes	Are they correctly calculated? Yes	Was propeller immersed? Yes
			Is data given for finding middle position with accuracy? Yes		
Course and Distance.			Is true course noted each 4 hours? Yes		
			Is distance " " " " Yes.		
Winds.	Character.	x	Direction: To two points or one point? One point		
			Are changes carefully given? Yes		
			Force: Are changes carefully given? Yes		
Barometer.	Character.	x	Is daily range regularly shown in tropics? Yes	Is ship's barometer recorded for comparison? Only once	
			Have comparisons been made with shore stations? No		
			Is there evidence of repetition or interpolation? No		
			Is attached thermometer always given? Yes		
			Is the true atmospheric pressure correctly given? Yes		
Dry and Wet Bulbs.	Character.	x	How is screen situated? Weather side, prior to observation		
			Is it well placed for observation? Yes		
			Is diurnal range shown? Yes		
			Any signs of being in sun? No		
			Any signs of being affected by local heat? No		
			Is there a fair difference ranging with weather? Yes		
Clouds.	Character.	v.g.	FORM: Well given? Yes	Regularly given? Yes	Simple and compound well separated? Yes
			DIRECTION UPPER: From? No		
Weather.	Character.	x	Is it fairly represented? Yes	Is notation correctly used? Yes	
			Is scale of fog and visibility used? Yes		
State of Sea.	Character.	x	Is direction regularly given? Yes	Is Douglas scale used? Yes	
			Disturbance 0 to 9? Yes		
Sea Temperatures.	Character.	x	Average number of observations daily? Six	Obs. read to 1/10	
			Name TESTS: Range with latitude		
Specific Gravity.	Character.	v.g.	Average number of observations daily? One		
			Name TESTS: Low in tropics Panama Bay		
Remarks. General.	Character.	v.g.	Are any interesting facts given? No		Initials.
			Are they full? Yes		
			Is there duplication in Remarks of information in other columns? Yes		Currents checked by
			Hydrographical? None		Do. extracted by 286
Wireless Weather Register.	Character.		Are Schedule times correctly used? Not a Selected Ship	Are messages correctly coded?	Log coded by 286
Application of Work to Navigation.	Character.				Log checked by
					Extraction checked by
			Previous Log No.	19047	

SYNCHRONIZED WEATHER OBSERVATIONS OVER ALL OCEANS.

OCEAN CURRENT OBSERVATIONS.

(Rig and Steam or Motor) Address to which acknowledgment for this report and the Marine Observer may be sent. EAGLE OIL AND SHIPPING CO. to SHELLHAVEN. MOTOR Ship. SAN ALBERTO. Captain C. V. D. O. T. Voyage—From BEAUMONT, TEXAS.

Main data table with columns for Year, Month, Day, Greenwich Mean Time, Ship's Position, Course and Speed, Wind, Barometer, Temperatures, Weather, Cloud Types, Sea, Swell, REMARKS, Time, Position, Set Direction, Drift, and Remarks.

* For Instructions for correcting the Barometer, see Marine Observer's Handbook, 5th Edition.

1 See Marine Observer's Handbook, 5th Edition.

Handwritten notes and signatures, including '417' and '9.03 A.M. 10.58 A.M. PA'.

Additional Remarks
It is requested that remarks upon interesting experiences and full descriptions of phenomena, etc., should be entered in this space with a view to publication in "The Marine Observer."

Particulars of Instruments:—(Please write word Ship in each case where not M.O.)

Barometer, (Mercury or Aneroid)? MEG CURRY Error? Too High
Maker of Instrument and No. (if any) KEVIN 106A. 05/MS at 29.22ms.
Numbers and Description of other Instruments— None

When and where last compared? MANCHESTER. 22/11/38.
Height above Sea level 40 ft.

Requirements for next voyage may, with advantage, be notified direct to the appropriate Port Meteorological Officer or Merchant Navy Agent. See list in "Marine Observer."

The observations recorded herein have been carefully made, and the Register, Form 138 attached, contains a true record of the coded messages sent by W. T., together with particulars of communication.

(If not a Selected Ship, cross out words in italics).

Date 1st March 1939.

Approved: J. P. Harrison (Head Office)
Signature and Rank of Principal Observing Officer.
Signature of Captain.

LETTERS TO INDICATE THE STATE OF THE WEATHER. OF THE WEATHER. DOUGLAS SEA AND SWELL SCALES SEPARATELY. SEA SCALE. SWELL SCALE.

ON HIS MAJESTY'S SERVICE.
The Director,
Meteorological Office (M.O.1.),
Air Ministry,
Kingsway,
LONDON, W.C.2.

SHIPS' METEOROLOGICAL RECORD OF SYNCHRONIZED OBSERVATIONS
METEOROLOGICAL OFFICE, LONDON.
AIR MINISTRY.
METEOROLOGICAL OFFICE, AIR MINISTRY, W.C.2.
1st May, 1930.

H.M.S. "Naiad", Wednesday 21st day of May, 1941
 From To or At Sea

Time	Log (Stating type)	Distance Run through the Water		True Course	Mean Revolutions per minute	Wind		Weather and Visibility	Sea and Swell	Corrected Barometric Pressure in Millibars	Temperature (°F)			REMARKS
		Miles	Tenths			Direction (true)	Force (0-12)				Dry Bulb	Wet Bulb	Sea	
														0006 Std. Handbell lg. 225° 0014-20kts. 0020 Commenced night zigzag.
0100	856.7	20	4	270°	208									0100 of 200° 0145 of 290° 0215 of 045° to close white light. 0220 of 090°
0200	876.5	4	8	000°	208									
0300	895.7	12	8	045°	208									0305 of 180° 0314 Bro Id. bore 142° 0330 of 270°
0400	914.6	7	9	180°	208	NNE	2	bc	10	1011.5	76	69	68	0340 of 090°
0500	933.8	6	4	090°	208									0542 of 110° Bro. bore 115°
0600	953.7	5	0	110°	208									0557 of 205° Speed 18 kts. 0600 (21) Standard 243° 0612 Std. Calcutta. Destroyer rejoined 21 Bro 080°
0700	972.9	9	6	205°	208									0630 Std. Dornier lg. 210° of 240° 0650 speed 20kts. Sunfire heard astern. 0656 of 070° 0700 Opened fire on Dornier. 0706 Bro 351°
0800	991.5	18	6	--	208	Caln	0	bc	10	1011	72	70	68	0842 South opened fire on enemy aircraft. 0848 (21) Standard 243° 0908 Opened fire on enemy aircraft. 0851 (21) Standard 243° 0912 Cease fire 0918 of 090° Speed 19 kts. 0937 of 140° 0948 Open fire on 6 ju. 87. Aircraft dropped bombs near Kingston. 1010 Open fire on 2 ju. 88. 1015-1022 aircraft dropped bombs near South Calcutta. 1022 1 ju. 88 probably damaged. 1025 of 180° 1032-1050 Enemy aircraft bombing.
0900	1009.8	18	3	--	198.5									
1000	1028.1	5	5	090°										
1100	1047.8	8	2	140°	198.6									
1200	1065.8	11	5	180°	208.5									1140 Commence zigzag No. 8.

Distance run through the Water	Position	Latitude	Longitude	Depending on	Currents experienced	ANCHOR BEARINGS
483.6	0800	35° 27' N	25° 41' E	Fix		
	1200	34° 47' N	26° 35' E	DR.		
Zone Time kept at noon	2000	33° 49' N	27° 06' E	DR.	Number on Sick List	2

1300	1085.9	20	1	180°	247.4									1220 Ceased zigzag. 1229 open fire on enemy aircraft. 1230 4 bombs near Calcutta. 1249 Opened open fire on 5 aircraft attacking ju. 88. 1250 ju. 88 hit. 1252 ju. 88 sank in approx. posn 34° 32' N 26° 35' E. 1255-1315 Kingston, Kandahar & Nabrian rescued 6 officers & 98 men. Russian decided to give AA protection. 1328 Std. Calcutta lg. 096°. 1330 Set Co. 180° 19kts. 1334 of as req. to close Calcutta. 1335 Enemy aircraft annid out H.L.S. attack. 1349 Co. 150° 19kts. 1410 Commence No. 8 zigzag. Speed 18 kts. 1500 Defence Stations.
1400	1104.5	18	6	as req.	207.9									
1500	1121.5	17	0	150°	2190.5									
1600	1139	17	5	--	188	Caln	0	bc	00	1011.5	75	68	67	1505 Cease zigzag of 330° 1523 Speed 20kts. Commence No. 8 zigzag.
1700	1156.7	17	7	--	188									
1800	1174.8	18	1	--	188	SE	1	bc	10	1011	76	70	67	
1900	1192.8	16	5	330°	2198									
2000	1211.9	19	1	--	208	NW	2	bc	10	1011	75	70	67	2000 of 342° normal night zigzag
2100	1231.5	19	6	342°	208									
2200	1250.8	19	3	--	208									
2300	1269.7	18	9	--	208									
2400	1289.2	19	5	--	208	N	4	bc	21	1011	71	68	68	2330 Action Stations MIDNIGHT

Intruder of the Watch

JB

AM

HJ

JB

AM

HJ

JB

Alley

H.M.S. *Suffolk*

Thursday day *30th* of *November* 1939

From _____ To _____ or at *North Sea*

FORM 11

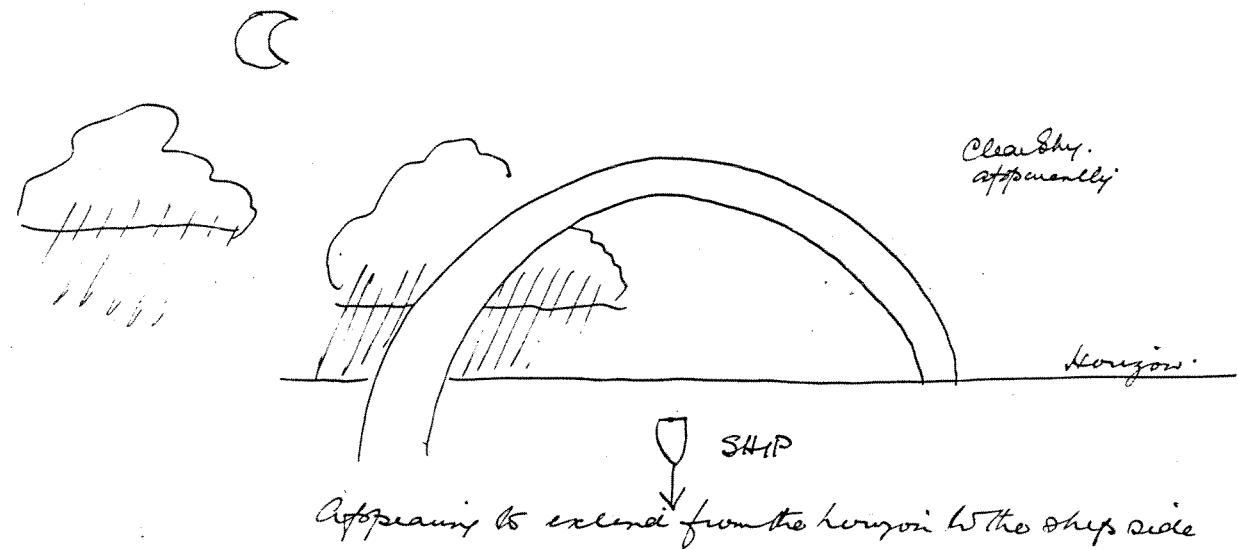
Zone Time (Zone)	Position		Wind		Barometer Reading in Millibars (corrected)	Barometric Tendency Characteristic Amount in Milli- bars per three hours	Temperatures (°F)			Relative Humidity %	Relative Humidity from Thermograph	Thermograph Reading (Dry) (°F)	Clouds			Amount of low cloud (tenths of sky covered)	Total amount of cloud (tenths of sky covered)	Height of base of low cloud (feet)	Present Weather	Visi- bility	Sea and Swell (Douglas Scale)	Swell, Direction (true)	
	Latitude	Longi- tude	Direc- tion (true)	Force 0-12 †			Sea	Dry Bulb	Wet Bulb				Low	Middle	High								
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)	(17)	(18)	(19)	(20)	(21)	(22)	(23)	(24)
0100																							
0200																							
0300																							
0400																							
0500																							
0600																							
0700																							
0800	60° 57' N	1° 42' E	280	7 (30)	996.0	3.00	56	49	45	53	53	48	6	-	3	5/10	6/10	E	3c	7	34	280	
0900																							
1000																							
1100																							
Noon																							
1300	60° 38' N	1° 23' E	323	6 (33)	994.2	2.16	69	46	40	54	54	46	2	-	3	4/10	7/10	E	c	6	44	300	
1400																							
1500																							
1600																							
1700																							
1800																							
1900																							
2000																							
2100																							
2200																							
2300																							
Midn't																							

REMARKS AND UPPER AIR DATA:

(† Including upper winds from smoke-burst and pilot balloon observations, and upper air temperatures and humidities)

A.M. Forecast. (Issued at.....for.....hours commencing.....)

Lunar Rainbow at 2115.



P.M. Forecast. (Issued at.....for.....hours commencing.....)

† When a wind speed recorder is fitted, speed in knots should be inserted in brackets after Beaufort Force, e.g. 7(30).

H.M.S. Striker

Thurs day 30th of March

From Gibraltar To U.K. or at

Zone Time (Zone C.M.T.)	Position		Wind		Barometer Reading in Millibars (corrected)	Barometric Tendency		Temperatures (°F)			Dew Point	Clouds			Amount of low cloud (tenths of sky cov'd.)	Total amount of cloud (tenths of sky cov'd.)	Height of base of low cloud (feet)	Present Weather	Visibility		Sea and Swell (Combined Scale)	Swell Direction (true)
	Latitude	Longitude	Direction (true)	Force 0-12 †		Characteristic	Amount in Millibars per three hours	Sea	Dry Bulb	Wet Bulb		Low	Middle	High					Away from the land	Towards the land		
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)	(17)	(18)	(19)	(20)	(20a)	(21)	(22)
0100																						
0200																						
0300																						
0400			E	6 (26)	1000.8	3	0.3					5			10	10	1000	0	2 (7)			
0500																						
0600			E	7 (27)	1001.4	3	0.4	52	52	50.5	49	5			10	10	800	0	3 (6)			
0700			E	7 (27)	1001.8	3	1.0								10	10	1000	0	3 (6)			
0800			E	7 (28)	1002.6	4	1.5	53	52	51	49	5			10	10	800	0	3 (6)	53	ENE	
0900			E	7 (28)	1003.1	1	1.7								10	10	1500	5	2 (5)			
1000			E'S	7 (31)	1003.8	2	2.0								10	10	1500	m	2 (5)			
1100			E'S	7 (32)	1004.2	2	1.6								10	10	1000	m	1 (5)			
1200	3	2.08 50° 35' N	30 18° 05' W	E'S	7 (30)	2	1.8	52	53	50	49	5	9	9	10	10	1000	1	2 (5)	54	E	084
1800				E'SE	7 (29)	2	1.9								10	10	1000	m	1 (5)			
1400				E'S	6 (25)	2	2.1								10	10	900	m	1 (5)			
1500				E'S	7 (27)	3	1.7								9	9	1500	m	1 (5)			
1600				E	7 (28)	1	1.2	52	50	49	48	5			10	10	1000	m	1 (5)	54	NEE	
1700				E	7 (29)	1	1.1								10	10	1000	m	2 (5)			
1800				E	7 (28)	2	1.3								10	10	1000	m	2 (5)			
1900																						
2000				E'S	7 (28)	2	1.4	55	49	48	46	5			10	10	800	m	1 (5)	57	E	
2100																						
2200				E'S	7 (29)	2	1.0								10	10	1000		3 (6)			
2300																						
2400																						

† When a wind speed recorder is fitted, speed in knots should be inserted in brackets after Beaufort Force, e.g., 7(30).
* Readings should preferably be entered in red ink if instrument is aspirated.

FLYING CONDITIONS

Flying from 0625 to 0930.

	Would flying be practicable				Are visibility and cloud conditions suitable for reconnaissance		Would high-level bombing be possible	
	(a) from a carrier		(b) for catapult-borne aircraft					
	In peace		In war					
a.m.	(a) Yes	No	(a) Yes	No	Yes	No	Yes	No
	(b) Yes	No	(b) Yes	No				
noon	(a) Yes	No	(a) Yes	No	Yes	No	Yes	No
	(b) Yes	No	(b) Yes	No				
p.m.	(a) Yes	No	(a) Yes	No	Yes	No	Yes	No
	(b) Yes	No	(b) Yes	No				

Note: Delete every "yes" or "no" which is not applicable.

FORECASTS, REMARKS AND UPPER AIR DATA

(† Including upper winds from smoke-cloud and pilot balloon observations, and upper air temperatures and humidities)

Forecast to 1900.

Inference A complex low N of the Azores has a frontal trough extending to N.W. Spain. A Ridge of High Pressure extending from Greenland to S. England is moving slowly S.W. behind a cold front.

Winds E. 25-30 kts. Tending to back slowly.

Weather Cloudy with occasional rain or drizzle.

Cloud 7 to 10 tenths at 1000 ft. but lowering to 500-600 ft. in rain.

Visibility 3.5 mls. but less than 2 mls. at times.

Sea Rough. Swell E. moderate.

Outlook Clearing somewhat with E. winds continuing.

Upper Winds

0430 Est. 0815 Obs.

Increase 095 26 094 30

1000 102 31 098 32

2000 109 39 106 27

3000 112 40 109 30 Est

4000 115 38 112 26

5000 118 35 115 22

6000 120 32 120 20

8000 122 26 128 15

10000 134 20 235 10

Forecast to 0700

Inference A very deep depression N. of the Azores is almost stationary. A cold front approaching from the N.E. will probably pass during the middle watch.

Winds E. 25-30 knots, gusting to 35 kts. at first. Moderating slowly.

Weather Mainly fair.

Cloud 10 tenths at 1000 ft becoming 3-6 tenths at 1500-2000 ft.

Visibility 2-5 mls. at first, clearing to 8-10 mls. by morning.

Sea Rough. Swell E. Rather heavy. Tending to moderate.

Outlook Less cloudy with moderate N.E. winds likely to-morrow.

REMARKS AND UPPER AIR DATA¹

(¹ Including upper winds from smoke-burst and pilot balloon observations, and upper air temperatures and humidities)

Zone Time (Zone 53a.)	Position		Wind		Barometer Reading in Millibars (corrected)	Barometric Tendency		Temperatures (°F)			Relative Humidity	Relative Humidity from Thermograph	Thermograph Reading (Dry) (°F)	Clouds			Amount of low cloud (tenths of sky covered)	Total amount of cloud (tenths of sky covered)	Height of base of low cloud (feet)	Present Weather	Visi- bility	Sea and Swell (Douglas Scale)	Swell, Direction (true)		
	Latitude	Longi- tude	Direction (true)	Force 0-12 †		Amount in Milli- bars per three hours	Sea	Dry Bulb	Wet Bulb	Low				Middle	High										
0100																									
0200																									
0300																									
0400																									
0500																									
0600																									
0700																									
0800	4°40'N	81°07'E	300°	4 12 knots	1012.7	3	2.0	83	82	78	83%	83%	82	5	3	0	4	5	2000 ft.	01	8	21	NW		
0900																									
1000																									
1100																									
Noon	4°48'N	81°38'E	330°	3 10 knots	1011.5	8	1.0	82	82	76	75%	75%	82	5	0	0	2	2	1500 ft.	01	8	21	N		
1300																									
1400																									
1500																									
1600																									
1700	4°50'N	82°35'E	360°	3 10 knots	1010.1	2	1.3	83	82	76	75%	75%	82	5	0	1	2	3	2000 ft.	01	8	21	N		
1800																									
1900																									
2000																									
2100																									
2200																									
2300																									
Midnight																									

A.M. Forecast. (Issued at 0800 for 9 hours commencing 0800)

Depression in Central Bay of Bengal has filled up. Weather was fine for some distance south and east of Ceylon. Forecast - Wind west to NW force 3 to 4. Weather fine. Visibility very good.

About 0800 several waterspouts observed near the ship depending from large cumulus clouds which were present in addition to the St. Cu reported opposite. Aircraft flying near one well developed waterspout observed it from about 100 yards range and reported it as rotating anticlockwise, diameter estimated at 30 feet near the middle but about 20 yards where it met the sea. The sea was much disturbed giving the impression that solid (liquid!) particles of water were being lifted into the air by the funnel shaped spout. The cloud appeared to be very dense from the aircraft underneath it and the pilot reported considerable bumpiness, though not so violent bumps as when flying inside a cumulus cloud itself. A heavy shower near the waterspout was tasted by the pilot & found to be salt water while a similar shower some distance away ^{from the spout} appeared to be fresh. These showers were not visible from the ship.

Flying conditions	0800		1200		1700	
	P	W	P	W	P	W
(a)	Yes	Yes	Yes	Yes	Yes	Yes
(b)	Yes	Yes	Yes	Yes	Yes	Yes
(c) (i)	Yes		Yes		Yes	
(ii)	No		Yes		Yes	

P.M. Forecast. (Issued at 1700 for 15 hours commencing 1700)

Wind between north and west ^{force 3 to 4}. Weather fine. Visibility very good.

¹ When a wind speed recorder is fitted, speed in knots should be inserted in brackets after Beaufort Force, e.g. 7(30).

ANNEX I

Cigarette End

Discovered in HMS CEYLON Deck Log 16 April 1937.

