



REMARKS
TO ACCOMPANY
MONTHLY CHARTS
OF
METEOROLOGICAL DATA
FOR SQUARE 3.

NET/2/1/3/31

REMARKS
BY CAPTAIN
MONTHLY CHARTS
OF
METEOROLOGICAL DATA
FOR
SQUARE 3;

REVISED TO 15° N. LAT. AND FROM 10° TO 30° E. LONG.

Published by Authority of the Hydrographical Office



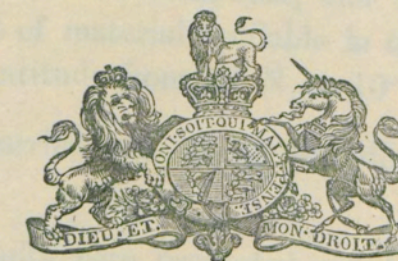
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REMARKS
TO ACCOMPANY THE
MONTHLY CHARTS
OF
METEOROLOGICAL DATA
FOR
SQUARE 3;
EXTENDING FROM THE
EQUATOR TO 10° N. LAT., AND FROM 20° TO 30° W. LONG.

Published by Authority of the Meteorological Committee.



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PREFACE.

THE Meteorological Committee, when they took charge of the former Meteorological Department of the Board of Trade in the year 1867, found that it was requisite to commence systematic investigations in the sphere of Ocean Meteorology.

For many reasons it was deemed advisable to discuss as thoroughly as possible the Meteorological conditions of a reasonably limited district, rather than to prepare charts embracing a larger area of the earth's surface.

This line of action having been adopted, it was obvious that the first region to be examined was the Doldrum district of the Atlantic, which is of necessity traversed by every ship which crosses the Equator in that ocean, and which therefore offers a greater abundance of material than any other district of equal size, unless perhaps the entrance to the Channel.

The present publication contains the Remarks illustrative of the Twelve Monthly Charts of Square 3, which extends from the Equator to 10° N. Latitude, and from 20° to 30° W. Longitude, and which itself affords 60 per cent. of the entire amount of material available in the office for the whole belt of the Atlantic of 30° of Latitude from 20° N. to 10° S.

The work has been carried out under the direction of Captain Henry Toynbee.

It is hoped that the results here presented will be found useful, as well to the scientific meteorologist as to the practical seaman, and that the information thus given as to the meeting of the Trade Winds in the Atlantic will ere long be rendered more complete by a supplementary paper, containing the results for the area of nine Ten-degree Squares, of which Square 3 forms the centre,

which is in an advanced stage of preparation. This latter publication cannot make any approach to the degree of minuteness of work which has been carried out in the present discussion, owing to the extreme paucity of materials for most of the eight outside Squares, when compared with those for Square 3.

August 1, 1874.

ROBERT H. SCOTT,
Director.

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INTRODUCTORY REMARKS.

MUCH good work has been done by Maury, FitzRoy, and the Hydrographical Department of the Admiralty under Admiral Richards, towards representing, in a general way, the Wind and other Meteorological Data of the Atlantic; but now that the Meteorological Office has been supplying standard instruments for 18 years on the plan commenced by Admiral FitzRoy, and receiving logs in which the Force of the Wind is always entered, it seems right that certain important parts of the sea should be dealt with in a more special way.

It has been decided to commence with the Equatorial Doldrums, because they are not only of the greatest importance to Sailing Ships, but Captains of Steamers, who are constantly passing through them, ask where they can get a prevailing wind with which to carry sail, and also where they will find the most favourable current.

The 10° square (No. 3 of Mr. Marsden's numbered squares*) extending from 10° N. to the Equator, and from 20° to 30° W., has been selected as the one of most importance, and in which the largest number of observations have been collected. See the small Chart in the lower left-hand corner of each larger Chart, which contains all the squares for which data have been extracted: in it No. 3 is shaded. Out of the 125,000 observations extracted from the logs of ships passing through the 26 squares given on this small Chart, nearly 60%† were made in SQUARE 3; this square has therefore been considered worthy to be made the subject of a special paper.

The data have been dealt with after the following method. Each log has been carefully examined as to the quality of the observations, and, when possible, five entries have been extracted for the 24 hours; but as it frequently happened that only three were available, and sometimes only one, we may suppose that on an average three entries have been extracted for each day, and from a rough estimate deduced from the times of barometer observations for three months, they seem to be distributed over the hours of the day in the following per-centages:

4 a.m., 18%†	6 a.m., 1%.	8 a.m., 8%.	9 a.m., 8%.	10 a.m., 2%.	Noon, 24%.
3 p.m., 7%.	4 p.m., 11%.	8 p.m., 12%.	10 p.m., 3%.	Midnight, 6%.	

The various hours for which the observations were taken may not give the true mean result for the 24 hours; still as the same hours have been generally extracted, it may be confidently considered that the Temperatures and Pressures obtained from the means of the whole will give good relative results for comparing the meteorological character of one part of the 10° square with that of another. In making the extracts *the hour of each observation has been recorded*, so that any inquiry depending on the hours might be carried out if thought requisite. Appendix A. will show what has been done in the way of determining the Diurnal Range. It tends to prove that the mean barometer and thermometer readings, as well as the isobars and isotherms, may be fairly depended

* See First Report of the Meteorological Department of Board of Trade (1857), p. 3.
† This symbol (%) is used to represent "per cent." throughout this work.

on, even though no range correction has been applied. It also shows, for January, the mean day of the month on which the barometer observations were taken in each 2° square, and points out that as the monthly range of pressure is so small, it is not necessary to apply any correction for the mean day of the month.*

The ship's position is generally given at noon; for other hours it is found by interpolation, and after applying the necessary corrections to each instrumental record, it is transferred to the data-book for its month, which is paged from 00 to 99. The *unit* figures of the *degrees* of latitude and longitude give the page to the extractor. For instance, suppose he had an observation taken in 8° 56' N. and 26° 2' W., he would turn to page 86 and record it. Again, suppose another in 0° 26' N. and 20° 32' W., it would be transferred to page 00. By these means all data are quickly sifted into one degree sub-squares† for each month, which gives the opportunity for discovering permanent differences in the direction and force of winds and currents, as well as in sea and weather.

Monthly Charts on the above-named plan of one hundred 1° sub-squares have been drawn, and remain for reference in this office; the smaller Charts, of twenty-five 2° squares, which accompany these Remarks, have been constructed from them.

CONSTRUCTION OF CHARTS.

A few words will now be said on the construction of the Charts.

Key Diagram.—The key diagram in the upper left-hand corner of each Chart fully explains what is to be found within the circles, as well as in the corners of the squares. It is to be hoped that this, together with the printed explanation in the corners of the Chart, will be considered sufficient guides to their use.

Marginal Strips.—It will be noticed that besides the twenty-five 2° squares in the central part of the Chart, there are fifteen marginal squares containing the data for certain strips.

Those to the right and left of the Chart contain the data of 5° of longitude by 2° of latitude, and give the opportunity for comparing the direction and force of winds, currents, &c. on the two sides of the square.

Those on the lower part of the Chart contain the data of 10° of latitude by 2° of longitude, and give the opportunity for comparing the prevailing direction and force of each Trade wind, &c. for every two degrees of longitude.

Besides the data given in the twenty-five 2° squares, these marginal squares contain the Per-centage and Force, of Wind and Current in each quadrant of the compass. In calculating these percentages all observations of—

N. to E. by N. are included in the N.En. quarter.	S. to W. by S. are included in the S.Wn. quarter.
E. to S. by E. „ S.En. „	W. to N. by W. „ N.Wn. „

* All the instruments were compared with a standard, and nearly all were tested at Kew, being supplied by the Meteorological Office, where they were re-examined at the end of each voyage: their index errors have been applied. The barometer observations have been reduced to 32° Fahr. by No. II. of Simmonds' Meteorological Tables, and also to sea level. Aneroid observations have not been used. The specific gravity observations have been reduced to the standard temperature of 62° Fahr. by the table of corrections for glass hydrometers furnished by Professor W. H. Miller, F.R.S. (See the 12th number of Meteorological Papers published by this Office, p. 17). Observations taken with brass hydrometers have not been used.

† See page 5 for a representation of the sub-squares in position. Throughout this work when any 1° sub-square is alluded to, it is expressed by "s.-s." and its number. In speaking of the central squares on the published charts they are called 2° squares.

The note to the Key Diagram explains that the right and left hand margins contain Weather, Clouds, and Swell or Sea for strips of 5° of longitude by 2° of latitude. Here the per-centages of exceptional weather are given: which per-centages are calculated on the number of *wind* observations, they being the most numerous, it being also supposed that "exceptional" weather was almost invariably noted when it existed, though "fine" was often omitted. It must be remembered that two or more kinds of exceptional weather may have been recorded at the time of one wind observation.

The per-centages of various clouds have been calculated on the total number of Cloud observations, but as two or three kinds of cloud are frequently recorded at the time of one observation, the sum of the per-centages will generally exceed 100.

Wind.—In all cases the *true* and not the compass Direction of the Wind has been given.

The *central area* and *two inner circles* in each square have been assigned to the wind.

Of these two circles the *outer* contains, in italics, the Number of Wind Observations for each point of the compass. Here it may be well to state that half points have been transferred alternately, to the point to the right and to that to the left; for example, six entries of N. $\frac{1}{2}$ E. would be entered as three to N., and three to N. by E.: quarter points have been given to their nearest point.

The *inner circle* contains the Force of the Wind by Beaufort's scale. A decimal has been given because in some cases there is a very great difference in the force represented by consecutive figures; for instance, 4 denotes a wind which will carry a well-conditioned ship-of-war of the late Admiral Beaufort's time* five to six knots an hour when "close hauled" in smooth water, whilst 5 denotes a wind to which the same ship in similar circumstances could just carry royals. Now it is well known that such a ship just carrying royals *in a smooth sea* might be going 9 or 10 knots an hour, *i.e.*, nearly double the speed represented by 4. In representing the force of wind on these Charts, 5 of Beaufort's scale has been supposed to represent nine miles an hour in the speed of his ship. (See the note to that scale in the upper right-hand corner of each Chart.)

It will be understood by the Navigator that it was requisite to suppose a certain fixed state of the sea when forming a scale of wind force which depended on the speed of a certain class of ship, for a heavy sea may reduce the speed by one half or more, other circumstances, of wind force, &c. being the same. Admiral Beaufort supposed the sea smooth, but as it is very frequently rough, especially with a force of 5, the Navigator must consider the state of the sea, as well as the relative sailing qualities of his ship and Beaufort's, before he can estimate what speed his ship will make with a given wind force on the Chart; and also before he can correctly record by Beaufort's scale the force of a wind which he is experiencing.

As space is limited, .0 has not been given when there was no decimal, hence a *single figure in the wind force always represents a whole number.*

* The first half of the present century.

As it is important to know where strong winds as well as squalls are experienced, and as the method in use on the Charts (of meaning the forces for each point) masks the force of specially strong winds, it has been thought right to make a separate record of all winds having a force of 7 or upwards, which were not squalls. (See Table 3, for each month.)

The *central circular area* in each square is devoted to arrows, showing by their relative lengths the *frequency* of the wind flowing into the square from each point. The arrow which extends from the circumference to the centre of this area flies from the point which has the largest Number of Observations: of course two or more such would represent two or more points with an equal number of observations. The length of all other arrows is in proportion to their number of observations.* These arrows are intersected by a curve showing the Force of the Wind by Beaufort's scale. Between the circumference of the wind-arrow-circle and that of the small inner circle the force is given in miles per hour of Beaufort's ship, and includes 1 to 5 of that scale, or $\frac{1}{2}$ to 9 miles per hour of his ship; but the radius of the inner circle is supposed to be divided into six equal parts, each representing a unit of Beaufort's scale, and carrying it on from 5 to 11. For further particulars see the note to Beaufort's scale given in the upper right-hand corner of each Chart.

The central area has also sections or points of the compass shaded black, which are to the whole area as the number of Calms is to the number of Wind Observations; for instance, if one quarter of the wind observations were calms, eight sections or points would be shaded, as there are 32 points in the whole circle.† The points selected for shading are those which have no wind observations, or, when none such exist, those which have the fewest. Hence the shaded sections, as well as the absence or shortness of the arrows, show the points which have the fewest winds.

The reader has therefore only to suppose himself at the centre of the circle, and the arrows tell him all the winds that have been known to blow into the square for the given month, their relative lengths indicating the relative number of times they have been recorded, whilst the curve (which may be supposed to represent a web travelling on the arrows, and to be driven nearer to the centre as the wind freshens) shows the Mean Force of each wind.

When the number of observations on any point is so small that the length of the arrow would not amount to a tenth of the radius, it has been omitted, but of course the number and the mean force are given in their proper places.

The accompanying reduction of the unpublished Charts divided into 1° sub-squares gives the Number of Logs, and also of Years, from which the *winds* of each sub-square have been obtained for the month of January. It shows that in those sub-squares which have data from only three or four logs, these data are generally spread over two or three years.

* The reader will perceive that there is no relation between the number of observations which produces the longest arrow in one 2° square, and that which produces the longest in another.

† This method of showing the proportion of calm was suggested by Wilfrid Airy, Esq., C.E.

DIAGRAM showing the NUMBER and POSITION of each SUB-SQUARE, the NUMBER of Logs, and NUMBER of YEARS.

SQUARE 3.

January.

	30° W.	29°	28°	27°	26°	25°	24°	23°	22°	21°	20° W.	
N. 10°	99 7 5	98 14 11	97 14 10	96 12 8	95 11 8	94 13 9	93 4 3	92 4 3	91 3 2	90 7 7		10° N.
9°	89 7 5	88 13 11	87 13 10	86 10 7	85 11 9	84 15 11	83 7 6	82 5 5	81 4 2	80 3 3		9°
8°	79 5 4	78 13 9	77 16 10	76 15 10	75 12 10	74 11 10	73 8 5	72 7 6	71 6 3	70 5 4		8°
7°	69 3 3	68 14 9	67 15 9	66 17 10	65 14 10	64 18 11	63 11 6	62 11 7	61 5 5	60 6 4		7°
6°	59 4 3	58 9 7	57 11 8	56 17 9	55 14 10	54 17 12	53 17 10	52 10 8	51 11 6	50 9 5		6°
5°	49 5 4	48 6 6	47 16 8	46 17 10	45 17 11	44 16 13	43 13 9	42 13 8	41 12 7	40 10 5		5°
4°	39 7 5	38 6 6	37 12 8	36 18 10	35 13 10	34 16 11	33 13 11	32 17 9	31 15 9	30 6 3		4°
3°	29 6 5	28 14 8	27 15 9	26 15 10	25 17 10	24 19 12	23 20 11	22 19 12	21 12 7	20 5 3		3°
2°	19 11 5	18 15 8	17 14 9	16 20 11	15 16 9	14 14 10	13 17 9	12 14 10	11 10 6	10 10 6		2°
1°	09 14 8	08 14 8	07 20 12	06 11 6	05 9 6	04 10 7	03 13 8	02 12 9	01 11 8	00 11 6		1°
0°												0°
	30° W.	29°	28°	27°	26°	25°	24°	23°	22°	21°	20° W.	

No. of Sub-square in Egyptian type.

No. of Logs represented in Roman type.

No. of Years represented in Italic type.

Currents.—In the *two outer* circles of each square are given the Current data in red figures, the *outer* circle containing the number of observations in italics; the *inner*, the mean number of miles in 24 hours. It is generally known that currents are named according to the point *towards which* they flow, instead of, as in the case of the wind, the point *from which* they come.

As the current of 24 hours is that which it is presumed acted upon a ship between the noons of a given day and the next; her position at the midnight, between the given noons, has been taken as the position of the current.

The octant containing the largest number of current observations is indicated by its being shaded red in the two outer or current circles. If an equal number exists in two or more octants the preference is given to that which has the greatest velocity in the 24 hours.*

In the small Diagrams on the lower right-hand corner of each Chart, the *tails* of the wind arrows, and *heads* of the current arrows are made to touch the circles at the points of the compass after which they are respectively named. The current arrows point towards the centre of the octant which has the largest number of observations, and the length of each arrow is governed by the hotchpotch mean of all the rates in that octant. When it amounts to 50 miles in 24 hours the arrow extends across the circle.

Isobars and Isotherms.—With the object of showing more clearly the relative distribution of Pressure and Temperature, Isobars (or lines of equal barometer), and Isotherms (or lines of equal temperature) of air and sea are given in the lower right-hand corner of each Chart. They are accompanied by arrows showing the Direction and Force of prevailing Winds and Currents. (See their explanation on the Charts.)

REMARKS.

In addition to the data on the Charts of 2° squares, it has been considered desirable to extract, under certain headings, the various important Remarks from logs, according to the strips of 10° of longitude by 1° of latitude, as it is supposed that the sub-squares forming such strips are liable to similar weather, but in order to make it possible to detect any difference depending on longitude, the extracts bear the numbers of their respective sub-squares, thus, "s.-s. 74," in which case the 4 shows the longitude.

It has not been thought requisite to publish all the extracts made under the various headings, but they remain, together with the monthly Charts of 1° sub-squares, as

* In computing the rate of currents from the difference between a ship's Observed and Dead Reckoning positions, all results of 5 miles or under in the 24 hours have been considered as "No current." The Mean Rate of Current in the upper right-hand corner of each square is found by combining the observations of current and no current in that square and taking the mean rate of all.

records in this Office, to be consulted when required by any person working at a special subject. They have, however, been used in drawing up the summaries for the various months.

The various headings and the nature of the extracts classed under them will now be given.

Currents.—All currents extending over more than 24 hours have been omitted on the Charts, but extracted in the Remarks: they have been, as near as possible, recorded in the remarks for the sub-square which contains the ship's mean position whilst experiencing the current.

When currents are given, at a certain rate per hour, but for no definite time, they are also omitted on the Charts, and brought into the remarks, as also are any allusions to current—or tide-rips. Quotations from these are published. (See p. 17 for those of January.)

Clouds.—The quarter from which upper clouds come, with the direction of the wind at the time, have been extracted, as well as the bearing of remarkable lower clouds. When the point from which *lower* clouds come differs materially from that of the wind the fact has been recorded. From these, the Table 8 for each month has been compiled.

Sea, Sea Temperature, Specific Gravity.—The Direction and Amount of Sea or Swell in each *sub-square* have been grouped under the eight principal points of the compass, whilst the confused and smooth seas have each a column. At the foot of each table are given all remarks on the colour and luminous state of the sea, also on temperatures below the surface, and on its specific gravity. A summary of the swell or sea data is given in the Eastern and Western strips of each published 2° Chart, and anything important in the remarks has been given after the remarks on currents. (See p. 18 for those of January.)

Wind.—Under this head come all remarks on getting or losing the "Trades" or "Doldrums," the force and direction of squalls when given, and all cases in which the wind has amounted to a force of 7 or upwards, as these last are lost by our method of only showing the mean force. From these remarks the Table 3 for each month has been compiled.

Weather.—All important remarks on Weather have been extracted: such as the direction in which lightning is seen; its nature, sheet or forked, &c., and any other important facts which cannot appear on the Charts. From these remarks the Table 11 for each month has been compiled.

General Remarks.—There are other remarks, such as those relating to natural history, falling stars, showers of dust, earthquakes, &c., &c., which could not be classified under any of the above headings, but were considered too valuable to be neglected:

they have therefore been extracted under the head of "General." The most important of these facts follow the remarks on weather. (See p. 26 for those of January.)

To render this paper more useful to the Navigator Appendices B. and C. have been added.

Appendix B. gives the monthly per-centage and mean force of wind from each of the four quarters of the compass, for the two halves of Square 39, which square contains the Cape Verd Islands. This should be consulted in connexion with the Table 12 for each month, which table gives the three points of each quarter from which the wind of that quarter *prevails*.

Appendix C. deals with the winds of the En. half of Square 303, which square contains Cape St. Roque. The per-centage and mean force of wind from each point of the compass is given for each degree of latitude. The En. half of the square is divided into two parts by the meridian of 33° W., which enables the Navigator to compare the winds near the land (between 33° and 35° W.) with those in the En. part of the square (between 30° and 33° W.).

It now only remains to add thanks for several valuable suggestions elicited by the circulation of the Chart of 1° sub-squares for January: they have been embodied in the Charts of 2° squares now published.

HENRY TOYNBEE,
Marine Superintendent.

REMARKS

SUGGESTED BY A

STUDY OF THE DATA FOR EACH MONTH, AND VARIOUS EXTRACTS FROM LOGS,

WITH

Recommendations as to the Best Routes for Crossing the Equator in each Month.

In drawing up these remarks, the unpublished Charts and Extracts from Logs containing the data sifted into *one degree* sub-squares by the method explained in the second paragraph of p. 2, have been consulted, because they sometimes show more clearly than the Charts of 2° squares the boundary lines of certain winds and currents, &c. Whenever allusion is made to "*lateral strips*," zones containing 10° of longitude by 1° of latitude are meant; whilst "*vertical strips*" are belts of 10° of latitude by 1° of longitude. The published 2° Charts give vertical strips containing 10° of latitude by *two* degrees of longitude. On the unpublished charts for 1° sub-squares the data for such strips have been summed and shown in the margins. The word sub-square alludes to 1° squares on the unpublished Charts, which are numbered as explained on p. 2: for instance, when it is remarked that "An earthquake was experienced in s.-s. 09," it means between the Equator and 1° N. and between 29° and 30° W.; or that "there was awful thunder with lightning in s.-s. 94," it means between 9° and 10° N. and between 24° and 25° W.

In consulting the Charts the Navigator must bear in mind that as the Doldrum (or region of lowest pressure lying between the two Trades) is nearly always travelling N. or S. after the sun, it is never in the same latitude at the end as at the beginning of a month. Accordingly, when a Chart shows that winds from different quarters have been experienced in a given part of the square in a given month, those of these winds which were most frequent there in the *previous* month, may be expected in the *early part* of the month, whilst those which are most common in the *following* month may be expected to blow in its *latter part*.

JANUARY.

Barometer.—The red isobar (see the diagrams* on the lower right-hand corner of the Chart) shows that the lowest pressure is on the Eastern side of the square where there is also the highest temperature of air and sea. The highest mean pressure in any lateral strip (29·958) is between 9° and 10° N., the lowest (29·921) lies between 4° and 5° N. The greatest increase of pressure in these strips since Dec. (·018) has taken place between 8° and 9° N., the greatest decrease (·010) between 4° and 5° N.

The mean of the means in all the lateral strips (29·937) indicates that the Mean Pressure of the square has but very slightly increased since December, but the above remarks show that this is the result of a balance between the increase in the Nn. and decrease in the Sn. part of the square. By comparing the mean pressures in vertical strips they are found to have decidedly increased on the Wn. and decreased on the En. side of the square since December. The relation of pressure to the prevailing wind is best shown by consulting the isobars and wind arrows: they show the increased strength and advance Southward of the N.E. Trade accompanying the increased pressure in the North since December, and also the great decrease of force in the prevailing S.Ely. wind accompanying the decrease of pressure in the South. The general course of the isobars for January resembles that of those for December. They are closest in the N.Wn. corner of the square where the wind is strongest.

Air Temperature.—The air isotherms show a great decrease of temperature in the Nn. part of the square since December, especially in its N.En. corner, whilst the highest temperature (due probably to the warm water in the Ely. current) is only 2° to the southward of the lowest. By comparing the lateral strips of December and January we find that the temperature has decreased 1°·6 between 9° and 10° N., whilst it has only decreased 0°·2 between 5° and 6° N. From 0° to 5° N. the average decrease is 0°·9. The Mean Temperature for the whole square (78°·4) shows a decrease of 0°·9 since December.

Dry and Damp Bulbs.—The lateral strip having the least difference between dry and damp bulbs (2°·7) is between 1° and 2° N.; between 2° and 3° N. the difference is 3°·1, whilst between 3° and 4° N. it is 2°·8. From 4° to 9° N. it gradually increases to 4°·1. Now between 3° and 4° N. we find the largest per-centage of Rain, the lowest Force of Wind, and the Nly. and Sly. winds seem to meet, so that the dampest air may well be in that neighbourhood. Since December the mean difference between dry and damp bulbs (3°·4) has not changed, but by comparing the differences in their lateral strips we find that there has been a general increase in the Nn. and decrease in the Sn. half of the square, owing no doubt to the Sn. progress of the Doldrum. The

* The foot note explaining these diagrams should be carefully read before consulting them.

vertical strips show a great increase in the Wn. and slight decrease in the En. differences since December.

Sea Temperature.—The sea isotherms also show a great decrease of temperature in the Nn. part of the square since December, especially in the N.En. corner, where in s.-s. 91 it amounts to 3°. A paper on "Currents and Surface Temperatures of the N. Atlantic," published by the Meteorological Office, shows that in January the sea isotherm of 70° nearly touches the N.En. corner of Square 3, whilst in December that of 80° occupies nearly the same position; hence we may conclude that the Sn. advance of the N.E. Trade brings with it the cold N. African current. It is, however, interesting to notice that the air remains cooler than the water, and it will be found that a difference of nearly a degree Fahr. holds very regularly throughout the year.

These isotherms also show that the temperature of the sea in the Sn. part of the square has *increased*; the changes of temperature in the lateral strips since December are as follow: between 9° and 10° N.—1°·8; 8° and 9° N.—1°·2; 7° and 8° N.—1°·2; 6° and 7° N.—0°·9; 5° and 6° N.—0°·4; 4° and 5° N.—0°·4; 3° and 4° N.—0°·3; 2° and 3° N. no change; 1° and 2° N. + 0°·2; 0° and 1° N. + 0°·6. The gradual progress in these changes seems to show how the Wly. current, due to the N.E. Trade (coming as it does from a part of the sea which is experiencing the Nn. winter), was decreasing in temperature, whilst that due to the S.E. Trade, which has its source where the Sn. summer is prevailing, was gradually increasing. In the south where the temperature of the sea increased, that of the air decreased; this was probably due to the Sn. progress of the N.E. Trade, as it was once met with in January, between 1° and 2° N.: see remarks on wind in Table 3. The Eastern strips, between 4° and 8° N. (see the red shading on the January Chart), as well as the red arrows on the small Sea Isotherm Chart, show that there is an Ely. current on the En. side of the square, where the hottest air and water prevail.

The Mean Sea Temperature for the whole square, in January (79°·4), has only decreased 0°·6 since December.

Specific Gravity.—The Marginal Strips on the published Chart show that the highest Specific Gravity (1·0272) is in the N.Wn. corner of the square, whilst the lowest (1·0266) lies between 2° and 4° N., in the Doldrums. Throughout the year it will be found that the lowest specific gravity is in the neighbourhood of the Doldrums, where there is most rain and least wind. Since December it has increased between 4° and 10° N., whilst it has decreased between 0° and 4° N.; the mean of the means in the lateral strips for January is 1·0268, showing no change since December.

WIND.

To assist the reader Tables 1 and 2 have been constructed from the Lateral and Vertical Strips on the unpublished Charts of 1° sub-squares.

TABLE 1.—LATERAL STRIPS.

Lateral Strips. 10° of Longitude by 1° of Latitude.	No. of Observations.	Mean Force of Strip.	N. to E. by N. or N.E.v.		E. to S. by E. or S.E.v.		S. to W. by S. or S.W.v.		W. to N. by W. or N.W.v.		Variables.		Calms.	Prevailing Wind.		Strongest Wind.	
			%	Mean Force.	%	Mean Force.	%	Mean Force.	%	Mean Force.	%	Mean Force.		No. of Observations. Direction.	Mean Force.	No. of Observations. Direction.	Mean Force.
9° to 10° N. -	126	4.4	97	4.4	2	4.0	—	—	—	—	1	5.0	—	²⁷ N.E.	4.7	²⁷ N.E.	4.7
8° - 9° N. -	136	4.4	98	4.4	1	4.5	—	—	—	—	1	4.0	—	³² N.E.	4.4	²⁰ N.E. by E.	4.7
7° - 8° N. -	170	4.1	85	4.3	7	3.9	—	—	4	3.4	3	2.5	1	³² N.E. by N.	4.3	¹⁸ N.E. by E.	4.5
6° - 7° N. -	219	3.4	74	4.0	8	3.3	1	2.0	4	2.4	6	2.0	7	⁴² N.E. by N.	4.2	¹ E.S.E.	6.0
5° - 6° N. -	304	2.6	58	3.3	18	2.8	1	1.6	2	2.1	8	1.5	13*	⁴⁵ N.E. by N.	3.6	⁴⁵ N.E. by N.	3.6
4° - 5° N. -	362	2.5	48	3.2	21	2.7	5	1.7	9	1.8	10	1.9	7	⁴¹ N.E. by N.	3.8	⁴¹ N.E. by N.	3.8
3° - 4° N. -	406	2.4	28	3.0	37	2.8	7	2.0	7	2.4	9	2.2	12	²⁸ S.S.E.	2.7	²² N.E. by N.	4.0
2° - 3° N. -	385	2.4	18	2.9	49	2.8	7	2.3	6	2.3	11	1.7	9	⁴⁴ S.E. by S.	2.8	² N.N.W.	3.5
1° - 2° N. -	383	2.4	12	2.4	51	3.0	12	2.1	4	2.1	11	2.2	10	³⁷ S.S.E.	2.8	² E.N.E.	4.5
0° - 1° N. -	279	2.9	9	3.0	70	3.2	7	2.5	3	2.1	6	2.2	5	⁴³ S.E.	3.1	¹ S.S.W.	5.0

* About half of the calms in this strip were found between 20° and 22° W.

TABLE 2.—VERTICAL STRIPS.

Vertical Strips. 10° of Latitude by 1° of Longitude.	No. of Observations.	Mean Force of Strip.	N. to E. by N. or N.E.v.		E. to S. by E. or S.E.v.		S. to W. by S. or S.W.v.		W. to N. by W. or N.W.v.		Variables.		Calms.	Prevailing Wind.		Strongest Wind.	
			%	Mean Force.	%	Mean Force.	%	Mean Force.	%	Mean Force.	%	Mean Force.		No. of Observations. Direction.	Mean Force.	No. of Observations. Direction.	Mean Force.
20° to 21° W.	208	2.5	45	3.1	26	2.7	8	2.1	7	1.9	6	1.5	8	²⁰ N.N.E.	4.0	²⁰ N.N.E.	4.0
21° - 22° W.	302	2.1	28	2.9	30	2.6	10	2.1	6	1.9	12	1.9	14	²⁴ N. by E.	3.2	³ S.S.W.	3.7
22° - 23° W.	304	2.4	34	3.0	30	2.9	6	1.9	7	2.4	15	1.9	8	¹⁷ N.N.E.	3.4	⁴ E. by S.	3.9
23° - 24° W.	330	2.7	41	3.5	31	2.8	4	2.4	5	2.1	8	2.3	11	²³ N.N.E.	3.5	¹⁷ N.E.	4.1
24° - 25° W.	353	2.9	46	3.6	30	2.9	4	2.3	4	2.4	7	2.5	9	³¹ N.E.	3.7	²⁶ E.N.E.	4.1
25° - 26° W.	289	3.0	48	3.9	30	2.8	5	2.0	4	2.0	6	1.7	7	²⁸ N.E. by E.	3.6	¹⁹ N.E. by N.	4.4
26° - 27° W.	343	3.1	43	4.0	33	3.1	5	2.2	5	2.6	7	1.8	7	³¹ N.E. by N.	4.0	¹⁰ N.E. by E.	4.4
27° - 28° W.	300	3.2	46	3.9	39	3.0	2	1.9	4	2.2	4	1.9	5	⁴⁶ N.E. by N.	4.0	¹⁹ N.E. by E.	4.3
28° - 29° W.	224	3.7	46	4.3	41	3.5	1	1.8	2	2.5	7	2.5	3	⁴² N.E. by N.	4.8	² E.S.E.	5.0
29° - 30° W.	117	3.5	44	4.2	40	3.5	11	2.0	2	1.3	2	1.8	1	¹⁷ N.E.	4.4	⁶ N.N.E.	5.2

By meaning the per-centages of various winds in the *lateral strips* (Table 1), and comparing the means with those for December, we have the following result for the whole square.*

N.E. wind 53 % and increased about 16 % since December.

S.E. „ 26 „ and decreased „ 23 „ „

S.W. „ 4 „ and increased „ 1 „ „

N.W. „ 4 „ „ „ 2 „ „

Variables 7 „ „ „ 3 „ „

Calms 6 „ not changed „

The Mean Force of the Wind for the whole square (3.2) has scarcely changed since December, but by comparing the forces of various winds, it is found that the N.E. Trade has decidedly increased in force, the change amounting to 0.7 of Beaufort's scale, or 1½ miles per hour of his ship, between 6° and 7° N.; whilst the S.E. Trade has lost the same amount of force throughout the whole zone, from 0° to 4° N., where it prevails.

Table 2 shows that there is a decided increase in the force of both N.E. and S.E. winds, and that there are fewer calms as you pass from the En. to the Wn. side of the square. These facts are graphically shown by the Wind arrows, Force curves, and Calm shadings, in the vertical strips on the lower part of the published 2° Chart.

* As the observations are very unequally distributed throughout the square it is thought best to take a mean of the per-centages and mean forces in the various strips of Table 1 for the general mean of the square. A reference to the number of observations in Table 1 shows that if a hotchpotch mean were taken the zone between 3° and 4° N. would have too much weight, for it has 406 observations, against only 126 between 9° and 10° N. The difference is even greater in some other months.

TABLE 3.

Latitude.	s.-s.	Winds, Force 7 or upwards, but not Squalls.	Direction of Squalls and heavy Squalls. (All Squalls Force 7 or upwards are considered to be heavy.) (All Squalls on either side of N., S., E., or W., are given to their respective quarters, so that there are fewer from the above-named points than from the quarters.)										s.-s.	REMARKS. NOTE. A bar, thus —, separates the Remarks of different Logs. The dates of Trade limits are in the order of the sub- squares in which they occurred, beginning with the most Eastern one.
			N.	N.E.	E.	S.E.	S.	S.W.	W.	N.W.				
			Heavy.	Heavy.	Heavy.	Heavy.	Heavy.	Heavy.	Heavy.	Heavy.				
			Heavy.	Heavy.	Heavy.	Heavy.	Heavy.	Heavy.	Heavy.	Heavy.				
9° to 10° N.	97	N.E.b.E. 7	—	1	—	—	—	—	—	—	—	99	Wind in gusts from patches of small black cumuli.	
8° to 9° N.	86	N.N.E. 7	—	—	—	—	—	—	—	—	—	88	Fresh N.N.E. gales.—Gusts of wind less heavy.	
	88	2 entries.	—	—	—	—	—	—	—	—	—			
7° to 8° N.	—	—	—	1	—	—	—	—	—	—	—	71-78	The Sn. limit of the N.E. Trade, 5th, 3rd, 3rd, 15th.*	
			—	—	—	—	—	—	—	—	—	77	Fresh N.Ely. gales.—Nly. wind in heavy gusts from passing patches of black cumuli.	
6° to 7° N.	68	N.N.E. 7	—	2	—	—	—	—	—	—	—	63-66	Sn. limit of N.E. Trade, 6th, 30th, 17th, 23rd.	
												65	A fresh gale (2 entries).	
												66	Ditto.	
												67	Fresh N.Ely. gales.	
5° to 6° N.	58	N.Ely. 7	—	1	—	—	1	2	—	—	—	50-57	Sn. limit of N.E. Trade, 8th, 17th, 21st, 1st.	
												56	Fresh Nly. gales.	
												57	1st, got the N.E. Trade. "We have had a very fa- vourable passage across the Doldrums, never lost the Ely. wind, smallest day's work 140 miles to the Nd."	
												58	Wind whistling in a peculiar manner and blowing in puffs or gusts.	
4° to 5° N.	48	N.E. 7	—	—	4	—	—	—	—	—	—	40-47	Sn. limit of N.E. Trade, 20th, 30th, 10th, 9th, 14th, 22nd, 22nd, 6th.	
		2 entries.										45	Nn. limit of S.E. Trade, 5th.	
												43	Terrific squall from N.E., force 9, with very heavy rain.	
												45	Another N.E. squall, force 8, and another, force 7.	
3° to 4° N.	38	N.N.E. 7	—	2	2	—	—	1	—	—	—	33-37	Another N.E. squall, force 7.	
		3 entries.										30-36	Sn. limit of N.E. Trade, 27th, 7th, 12th, 23rd, 29th, 22nd.	
												32	Nn. limit of S.E. Trade, 28th, 13th, 12th, 13th, 1st.	
												35	Stiff gale E. 9.	
												36	Have had scarcely any Doldrum.	
													A terrific squall from N.N.E., lasting 2 hours.	
2° to 3° N.	—	—	—	1	—	—	1	—	1	—	—	24 & 28	The other heavy squalls, one N.E. and one S.E., were on the En. side of the square.	
												24-28	Sn. limit of N.E. Trade, 28th, 22nd.	
												28	Nn. limit of S.E. Trade, 14th, 1st, 22nd.	
													22nd, wind hauled from E. b. S. to N.E. b. E. in a light squall, did not have an hour's Doldrum.	
1° to 2° N.	—	—	—	1	1	—	—	—	—	—	—	29	In the Doldrums.	
												13	Sn. limit of N.E. Trade, 17th.	
												10-19	Nn. limit of S.E. Trade, 20th, 26th, 17th.	
												18	Wind veering and hauling constantly between N.N.W. and E.N.E.	
0° to 1° N.	—	—	—	—	—	—	1	—	—	—	—	05 & 08	Nn. limit of S.E. Trade, 31st, 10th.	
													The S.E. squall had force 6.	
Sum -	-	10, and all N.Ely.	—	9	7	—	3	3	1	—	1	—		

NOTE.—Nearly all the strong winds not being squalls were to the Wd. of 28° W.

Two of the heavy N.Ely. squalls were on the Wn. and five on the En. side of the square.

Two of the heavy S.Ely. squalls were on the Wn. and one on the En. side of the square.

* The dates are given in the order of the sub-squares, for instance the Sn. limit was noticed in s.-s. 71 on the 5th, in 75 on the 3rd, in 78 on the 3rd and 15th; this may help to show whether a Trade extends further into the square, at a given date, on one side than on the other.

Table 3 has been mainly constructed from the remarks on wind in the logs: it gives the Lateral Strip, Sub-square, Direction and Number of Observations of Steady Winds, having a force of 7 or upwards; also the Direction of Squalls and Heavy Squalls. Its remarks show the boundary of the Trades, and other important facts of interest to Navigators. It shows how in January all the gales and steady winds of force 7 or upwards, as well as 64% of the squalls, are from the N.Ed., and how entirely the strong winds are confined to the Wn. part of the square. Between 3° and 5° N. there are "terrific" squalls from the N.Ed.

The closeness of the isobars in the N.Wn. corner of the square indicates that the strongest wind should be there; a fact which is well borne out by this table and its remarks.

CURRENTS.

TABLE 4.

LATERAL STRIPS.

Lateral Strips. 10° of Longitude by 1° of Latitude.	No. of Observa- tions.	Mean Rate.	N. to E. by N. or N.Ey.		E. to S. by E. or S.Ey.		S. to W. by S. or S.Wy.		W. to N. by W. or N.Wy.		None.	Prevailing Current.		Strongest Current.*	
			%	Mean Rate.	%	Mean Rate.	%	Mean Rate.	%	Mean Rate.		No. of Observations.	Mean Rate.	Direction.	Rate.
												Direction.			
9° to 10° N.	19	7	16	9	—	—	21	8	26	14	37	W.S.W.	10	N.W.	22
8° - 9° N.	23	11	22	13	9	10	21	14	26	16	22	W.N.W.	17	S.W.	29
7° - 8° N.	16	10	6	6	6	13	38	13	19	22	31	W.N.W.	28	W.N.W.	28
6° - 7° N.	27	8	11	14	26	12	11	15	19	11	33	E.S.E.	14	S.W. by W.	24
5° - 6° N.	37	12	13	16	27	17	22	16	11	16	27	E.	16	W. by S.	37
4° - 5° N.	35	15	14	18	26	21	14	19	29	15	17	E.	21	E. by S.	30
3° - 4° N.	44	12	14	12	13	14	7	8	43	18	23	W.	17	N.W. by N.	30
2° - 3° N.	45	18	4	11	5	19	13	10	67	22	11	W. by N.	29	N.W.	50
1° - 2° N.	42	25	—	—	—	—	14	22	79	27	7	W.N.W.	24	N.W. by W.	49
0° - 1° N.	40	23	—	—	8	13	22	23	68	24	2	W.	26	W. by N.	48

* The strongest current in each Strip is here given, as it is important to the Navigator to know the extreme to which he is liable.

TABLE 5.

VERTICAL STRIPS.

Vertical Strips. 10° of Latitude by 1° of Longitude.	No. of Observations.	Mean Rate.		N. to E. by N. or N.E'y.		E. to S. by E. or S.E'y.		S to W. by S. or S.W'y.		W. to N. by W. or N.W'y.		None.	Prevailing Current.		Strongest Current.*	
		%	Mean Rate.	%	Mean Rate.	%	Mean Rate.	%	Mean Rate.	%	Mean Rate.		No. of Observations.	Mean Rate.	Direction.	Rate.
20° to 21° W.	26	12	15	9	15	15	12	16	23	29	35		W.N.W. ³	17	N.W.	50
21° - 22° W.	31	15	26	17	6	16	10	11	35	24	23		W. ³	24	W.	34
22° - 23° W.	32	18	6	11	9	15	13	17	63	22	9		N.W. ⁵	30	N.W. by W.	49
23° - 24° W.	42	14	5	19	21	18	22	15	33	19	19		W. ⁵	18	W. by N.	38
24° - 25° W.	40	14	5	11	23	17	25	19	25	17	22		W.N.W. ⁵	18	W. by S.	45
25° - 26° W.	30	18	7	15	13	15	20	20	47	23	13		W. by N. ⁵	24	W.	48
26° - 27° W.	39	14	10	9	8	14	10	16	49	22	23		W. ⁶	21	W. by N.	48
27° - 28° W.	39	17	5	13	5	15	18	15	62	21	10		W. ⁹	23	W.	39
28° - 29° W.	32	13	9	14	3	17	22	13	44	18	22		W. ⁴	20	N.W. by W.	38
29° - 30° W.	17	20	6	24	17	15	12	10	59	26	6		W. ³	27	N.W. by W.	36

Tables 4 and 5 give the currents in the same form as Tables 1 and 2 do the winds: Table 4 shows that Wly. currents prevail in the Nn. and Sn. parts of the square, though Ely. are most frequent between 5° and 7° N.

Table 5 and the published 2° Chart show that this Ely. current is chiefly on the En. side of the square. The difference of temperature in the two Wly. currents has already been remarked on (see p. 11): Table 4 shows how much stronger that near the Equator is than the Nn. one, but these facts are graphically shown on the small diagram of isotherms of sea and prevailing currents, in the lower right-hand corner of the Chart.

The Wly. current in the Sn. part of the square, which is due to the S.E. Trade, may be expected to be stronger than that in the Nn. which is due to the N.E. Trade; for (although in January, and several other months, the N.E. wind in the square is stronger than the S.E.), it must be remembered that SQUARE 3 has the full sweep of the S. Atlantic to the S.E. of it, over which comes the S.E. Trade and the water which it drives before it, without meeting any impediment; this is not the case with respect to the N.E. Trade, for SQUARE 3 has Africa at a distance of about 250 miles to the N.E. of it.

If we remember that the areas of high atmospheric pressure lying over the Atlantic in about 30° to 40° North and South may to a certain extent be considered to

* The strongest current in each Strip is here given, as it is important to the Navigator to know the extreme to which he is liable.

be the sources of the Trade winds, and that the Nn. one is to the N.Wd., whilst the Sn. one is to the S.Ed. of SQUARE 3, it is clear that this square (in spite of its Nn. position) is more favourably placed for getting the S.E. than the N.E. Trade, and consequently the current which the S.E. Trade produces.* This argument is supported by the fact that between 40° and 50° W. the N.E. Trade extends several degrees to the *southward* of the Equator during our winter months; now the N.E. coast of S. America has open sea to the N.Ed., between it and the source of the N.E. Trade, but it has Cape St. Roque, &c., between it and the source of the S.E. Trade.

If the reader will refer to the prevailing wind arrows on the isobar diagram, and consider that the N.E. and S.E. Trades both draw water away from the Coast of Africa, and, as it were, heap it up in the Doldrums between them, where there is little wind, he will expect to find that there is a back drift to the Ed. in the Doldrums, and that the water of the Ely. current is the warmest, as it has been longest between the Tropics.

The Remarks on Currents show that there is most Wly. current between 0° and 4° N., and most Ely. between 4° and 6° N.

Current Rips were most frequently remarked upon between 1° and 2° N., and again between 6° and 7° N.

The following remarks seem worthy of extraction:—

Sub-square.

71. Heavy tide rips making much noise at times.
55. Passed through a line of froth extending N.E. and S.W. (No wind blowing at the time.)
07. Passed across a rippling extending in a S.E. and N.W. direction. Temperature of sea on its En. side 80°·5, on its Wn., 79°. Wind Sly., force 2. Ship's head S.Wly. When the ship was immediately over the ripple she came up to S.S.E. against her helm. There were many small fish and much blubber about the ripple, also two sharks. Caught one whose maw only contained the decomposed wing of a flying fish.
09. 25th. Sighted St. Paul's Rocks, and found by bearings that we were set about N. 80° W. 2 knots an hour. (Ship bound to the Sd.)

* The proportion of red to black arrows on the isobar charts shows that Square 3 has about 60 % of Sly. and 40 % of Nly. wind during the year.

SEA.

The sea was remarked on as being "very luminous" three times between 7° and 9° N., nine times between 0° and 4° N. There are eight entries of its being "deep blue" between 0° and 6° N., but none elsewhere.

s.s. 28. Tried for temperatures at various depths from a boat:—

Surface temperature 80° at 8 a.m.
At 50 fathoms " 79
" 100 " " 67.5
" 225 " " 60.5 at 1.30 p.m.

The Eastern and Western strips in the January Chart show how the Nly. and N.Ely. swells prevailed over the Sly. and S.Ely. even in the Sn. part of the square where S.Ely. winds prevailed and had prevailed for several months, indicating how far the swell will overrun the wind that caused it.

Sly. swells are more abundant on the En. than on the Wn. side of the square, especially in its Nn. part.

CLOUDS.

Tables 6, 7, and 8, with the remarks on clouds, are compiled from the data for 1° sub-squares.

TABLE 6.—LATERAL STRIPS.

PER-CENTAGES of EACH FORM, and MEAN AMOUNT of all CLOUDS.

Lateral Strips. 10° of Longitude by 1° of Latitude.	No. of Observa- tions.	Upper Clouds.			Lower Clouds.				Amount, 10 being "completely Clouded."	
		Cir.	Cir.-c.	Cir.-s.	Cum.	Cum.-s.	Str.	Nim.	No. of Obs.	Mean.
		%	%	%	%	%	%	%		
9° to 10° N. -	95	12	25	3	60	2	13	6	109	4.8
8° - 9° N. -	105	5	30	9	57	8	5	7	112	5.5
7° - 8° N. -	111	11	20	7	57	8	5	11	127	5.4
6° - 7° N. -	148	8	18	9	53	18	5	16	164	6.0
5° - 6° N. -	195	6	15	6	37	19	5	28	223	6.3
4° - 5° N. -	235	7	16	6	39	15	14	31	282	6.9
3° - 4° N. -	257	5	9	5	42	21	7	38	327	7.1
2° - 3° N. -	242	13	14	9	45	14	6	37	283	6.5
1° - 2° N. -	220	8	13	7	40	18	8	33	275	6.8
0° - 1° N. -	194	12	11	7	41	19	10	29	227	5.7

TABLE 7.—VERTICAL STRIPS.

PER-CENTAGES of EACH FORM, and MEAN AMOUNT of all CLOUDS.

Vertical Strips. 10° of Latitude by 1° of Longitude.	No. of Observa- tions.	Upper Clouds.			Lower Clouds.				Amount, 10 being "completely Clouded."	
		Cir.	Cir.-c.	Cir.-s.	Cum.	Cum.-s.	Str.	Nim.	No. of Obs.	Mean.
		%	%	%	%	%	%	%		
20° to 21° W. -	102	7	9	10	44	8	9	25	143	5.6
21° - 22° W. -	158	6	11	7	36	27	10	25	219	6.9
22° - 23° W. -	172	9	8	3	55	24	6	17	215	6.7
23° - 24° W. -	215	11	12	2	42	9	8	30	246	6.2
24° - 25° W. -	228	9	12	7	46	17	8	42	277	6.4
25° - 26° W. -	222	7	18	9	41	15	9	31	224	6.3
26° - 27° W. -	248	3	15	10	44	16	8	27	285	6.2
27° - 28° W. -	212	14	15	4	41	12	10	25	249	6.0
28° - 29° W. -	170	11	29	5	51	13	4	22	183	6.6
29° - 30° W. -	75	7	36	9	55	13	4	15	88	5.9

By taking the mean of the per-centages in Table 6 we find that there has been a slight increase in the proportion of Nimbus since December, but by comparing the per-centages for each month in the different strips we find that it has decreased in the Nn., and increased in the Sn. half of the square, the increase amounting to nearly 27 % between 0° and 2° N.

The mean Amount of Cloud in the whole square (6.1) has also increased 0.3 since December, but we find that from 5° to 10° N. it has *decreased* 0.4, whilst from 0° to 5° N. it has *increased* 0.9. Between 1° and 2° N. the increase amounts to 1.9, indicating the Sn. progress of the Doldrums.

Table 7 indicates that there is rather more Nimbus and Cloud generally in the En. than in the Wn. half of the square: we also find that both Nimbus and Amount of Cloud have increased rather more in the Wn. than in the En. half of the square since December.

TABLE 8.

The following table is derived from the Remarks on Clouds in January :—

NOTE.—All cloud entries from N. to E. b. N. inclusive have been given to the N.En. quarter.
" " E. b. S. to S. " S.En. "
" " S. b. W. to W. b. S. " S.Wn. "
" " W. b. N. to N. b. W. " N.Wn. "

Upper clouds from E. or W. have been extracted in the remarks. Lower clouds flying with the wind have not been recorded.

Quarters from which the Clouds and Wind came.		Lower Clouds.			Clouds (doubtful whether upper or lower).			Upper Clouds.		
Clouds from.	Wind from.	Total No. of Observations.	No. in Nn. Half of Square.	No. in Sn. Half of Square.	Total No. of Observations.	No. in Nn. Half of Square.	No. in Sn. Half of Square.	Total No. of Observations.	No. in Nn. Half of Square.	No. in Sn. Half of Square.
N.En.	N.En.	—	—	—	—	—	—	15	11	4
"	S.En.	5	—	5	6	1	5	11	1	10
"	S.Wn.	—	—	—	1	—	1	—	—	—
"	N.Wn.	—	—	—	—	—	—	2	—	2
"	N.	—	—	—	—	—	—	1	—	1
"	E.	1	—	1	—	—	—	—	—	—
		6	—	6	7	1	6	29	12	17
S.En.	N.En.	4	1	3	11	9	2	28	20	8
"	S.En.	—	—	—	—	—	—	7	—	7
"	S.Wn.	2	—	2	—	—	—	4	—	4
"	N.Wn.	—	—	—	1	—	1	7	2	5
"	N.	—	—	—	—	—	—	1	—	1
"	S.	1	—	1	—	—	—	—	—	—
"	E.	—	—	—	1	—	1	5	2	3
"	W.	—	—	—	—	—	—	2	—	2
		7	1	6	13	9	4	54	24	30
S.Wn.	N.En.	1	—	1	—	—	—	36	31	5
"	S.En.	—	—	—	1	—	1	3	—	3
"	S.Wn.	—	—	—	—	—	—	2	—	2
"	N.Wn.	—	—	—	—	—	—	6	5	1
"	N.	—	—	—	1	1	—	2	1	1
"	E.	—	—	—	—	—	—	5	5	—
		1	—	1	2	1	1	54	42	12
N.Wn.	N.En.	—	—	—	1	—	1	6	6	—
"	S.En.	—	—	—	1	—	1	2	—	2
"	N.Wn.	—	—	—	—	—	—	1	—	1
		—	—	—	2	—	2	9	6	3

NOTE.—The following are the per-centages of upper clouds from the various quarters, 146 being the total number of observations.

From the N.En. quarter 20%, being — 14% since December.
" S.En. " 37% " — 3% "
" S.Wn. " 37% " + 21% "
" N.Wn. " 6% " — 4% "

The number of observations on the motion of upper clouds has increased in both the Nn. and Sn. halves of the square since December, most in the Nn. half. The above per-centages show how much more frequent are upper clouds from a Sly. than from a Nly. direction.

In the Nn. half of the square the largest number of upper clouds was from the S.Wd., wind N.Ely.; in the Sn. half the largest number was from the N.Ed., wind S.Ely., but those from the S.Ed., wind N.Ely., were nearly as abundant.

Of the 20 entries of upper clouds from the S.Ed. when the wind was N.Ely., given in the Nn. half of the square, 8 were observed between 6° and 7° N.; whilst of the 31 entries of upper clouds from the S.Wd., with the wind N.Ed., 10 were between 9° and 10° N. This supports the idea that the S.E. Trade rises above the N.E., and (as an upper current) gradually changes its direction from S.E. to S.W. as it progresses to the Nd. The N.E. Trade seems also to rise above the S.E., i.e., the upper clouds seem to come frequently from N.E. on the equatorial verge of the S.E. Trade; but, as SQUARE 3 is to the Nd. of the Equator, we can hardly expect to find that a change of latitude diverts their direction to N.W.: this fact may be shown when we work up the data of Square 302 to the Sd. of the Equator.

The foot note to Table 8 shows the changes which have taken place since December.

The following remarks on clouds seem worthy of extraction :—

Latitude.	Sub-square.	Remarks from Logs. <i>Note.</i> A bar, thus —, separates the remarks from different Logs.
9° to 10° N.	91	Singular and fantastic shaped cir.-c.
	98	Dense cum. on horizon all round.
6° to 7° N.	63	Clouds from S. by E., no wind.*
	65	Cir.-c. from S. by E., no wind.
	66	Heavy clouds from S.W. by S., no wind.
5° to 6° N.	51	Cir.-c. from S. E. by S., no wind (2 entries).
4° to 5° N.	46	Upper clouds from S. E. by S., cum. from W., wind N. E. by N.—All through the day there have been three distinct strata of clouds: upper (cir.-s. and cir.-c.) from S.W.; middle (cum.-s or nim.) from the Ed., bringing heavy showers; lower from N.E. by N. with the wind.
	47	Clouds from all directions.
2° to 3° N.	25	Clouds from N.E. by E., no wind.
	27	Lower clouds from the S.Ed., no wind.
1° to 2° N.	14	Every cloud appears to have its own course.
	15	Clouds from S.E. by E., no wind.
	16	" "
	18	Clouds crossing one another in all directions, mostly from S.S.E., N., and N.E.: some few from W.
0° to 1° N.	01	Cir.-c. and cir.-s. from the Ed., wind S.S.E.
	03	Upper clouds from the Ed., wind E.S.E.

* No wind means that it was calm at the time.

WEATHER.

TABLE 9.—LATERAL STRIPS.

Lateral Strips, being 10° of Longitude by 1° of Latitude.	Thunder. (t.) %	Lightning. (l.) %	Squalls. (q.) %	Rain. (r.) %	Mist. (m.) %	Dew. (w.) %
9° to 10° N. - - -	1	2	1	3	44	1
8° to 9° N. - - -	-	5	2	-	41	1
7° to 8° N. - - -	2	10	6	8	35	1
6° to 7° N. - - -	6	11	11	14	32	-
5° to 6° N. - - -	7	15	10	19	19	$\frac{1}{3}$
4° to 5° N. - - -	9	21	13	25	15	$\frac{1}{2}$
3° to 4° N. - - -	6	18	15	32	7	$\frac{1}{2}$
2° to 3° N. - - -	4	14	13	22	7	-
1° to 2° N. - - -	4	11	8	25	6	$\frac{1}{4}$
0° to 1° N. - - -	2	6	8	19	6	$\frac{3}{4}$

TABLE 10.—VERTICAL STRIPS.

Vertical Strips, being 10° of Latitude by 1° of Longitude.	Thunder. (t.) %	Lightning. (l.) %	Squalls. (q.) %	Rain. (r.) %	Mist. (m.) %	Dew. (w.) %
20° to 21° W. - - -	5	15	5	11	20	$\frac{1}{2}$
21° to 22° W. - - -	8	15	9	29	13	1
22° to 23° W. - - -	7	15	8	23	16	$\frac{1}{3}$
23° to 24° W. - - -	8	20	9	19	20	1
24° to 25° W. - - -	5	15	9	21	17	-
25° to 26° W. - - -	6	16	14	24	15	-
26° to 27° W. - - -	3	12	13	22	14	1
27° to 28° W. - - -	2	6	7	16	18	-
28° to 29° W. - - -	1	4	15	14	17	$\frac{1}{2}$
29° to 30° W. - - -	1	3	9	14	10	-

TABLE 11.

This table gives the number of times that Lightning of any kind has been seen on various points of the compass in the lateral strips of 1° of latitude by 10° of longitude. Only the bearings recorded as actually N., S., E., and W., have been entered to those points, all others have been given to their various quarters. When an observation states that lightning was seen between two points, the mean bearing has been taken for the table, and the remark extracted.

Lateral Strips, being 10° of Longitude by 1° of Latitude.	Number of observations.	N.	N.E.	E.	S.E.	S.	S.W.	W.	N.W.	All round	No direction given.
9° to 10° N. - - -	4	-	-	-	2	1	-	-	-	-	1
8° to 9° N. - - -	4	-	1	-	2	-	1	-	-	-	-
7° to 8° N. - - -	8	1	1	-	3	2	-	1	-	-	-
6° to 7° N. - - -	12	1	1	-	3	3	-	-	2	-	2
5° to 6° N. - - -	10	-	2	-	2	3	2	-	-	-	1
4° to 5° N. - - -	25	2	2	4	6	1	4	-	1	2	3
3° to 4° N. - - -	28	7	11	-	1	1	-	1	2	1	4
2° to 3° N. - - -	21	-	4	3	2	-	1	-	3	3	5
1° to 2° N. - - -	20	2	9	1	3	-	-	-	3	-	2
0° to 1° N. - - -	9	-	2	1	3	-	-	-	1	1	1
Total for the month and how distributed -	141	13	33	9	27	11	8	2	12	7	19

Table 9 gives the per-centages of six of the most important notations of weather in the 10 lateral strips: by comparing it with that for December we find that *t*, *l*, *q* and *r* have decidedly decreased in each strip in the Nn. half of the square, and increased in the Sn.

Lightning has decreased 9% between 6° and 7° N., whilst it has increased 9% between 2° and 4° N.

Squalls have decreased 5% between 7° and 9° N., whilst they have increased 5% between 0° and 3° N. Between 0° and 7° N. about one squall in 11 was "heavy." There were only three "very heavy" squalls, and they were between 3° and 6° N.

Rain has decreased nearly 8% between 6° and 9° N., whilst it has increased 17% between 1° and 4° N. The rain entries are "heavy" about once in four, and "very heavy" once in eleven times.

Mist (Haze) has decreased between 1° and 3° N. since December, but increased elsewhere; between 6° and 8° N. the increase amounts to 18%, whilst the largest amount (44%) lies between 9° and 10° N. "Heavy" mist abounded in the Nn. half of the square, and it was once "very heavy" in s.s. 65. This is clearly related to the red dust, which abounds at this season of the year. The accompanying January Chart shows a much larger per-centage of mist in the En. than in the Wn. strips of the Nn. part of the square, indicating that Africa is its source.

A glance at Table 9 shows how (to ships coming from the Nd.) the per-centage of Mist decreases as that of Rain increases, even though the prevailing wind continues to be Nly. down to 4° N. This seems to show that the rain washes the air, removing dust particles from it.

Dew has increased in amount in the Nn. part of the square since December, and decreased in the Sn.: this seems to be related to the appearance of the coldest sea in the Nn. part of the square, instead of in the Sn., where it was in December (see the isotherms of sea). It seems probable that the dampness caused by the influx of cold water into the N.En. part of the square, mixed with the red dust, brought by the N.E. wind, causes that very oppressive weather complained of in this part (see the remark on weather in s.s. 90, &c., &c.).

Those who have experienced the Sly. "long-shore" winds, which blow in Madras in March, mixing the red dust of the roads with the moisture floating in the air from the surf, must perceive a likeness to the weather we are dealing with.

Table 10 and the published Chart show that the weather in the Wn. half of the square is generally more settled than in the En., excepting in the case of squalls, which abound most in the Wn. half, where the N.E. wind is so strong.

Table 11 shows the number of times that Lightning was seen in various directions. From 0° to 4° N., where Sly. winds prevailed, it was most frequently seen in some Nly. direction; whilst from 4° to 10° N., where Nly. winds prevailed, it was most frequently seen in some Sly. direction, indicating how it chiefly occurred where the two winds met.

The following remarks speak for themselves, as they give the kind of lightning and its bearing whenever recorded; also other remarkable weather:—

Latitude.	Sub-square.	Remarks on Weather.
		Note. A bar, thus —, separates the Remarks from different logs.
9° to 10° N.	90	Air very close and suffocating.
	94	Awful t. and l. with very heavy r. "Corposants" at the mastheads and yard arms; impossible to see anything from 3 to 4.30 a.m., the l. was so vivid. (The wind was variable from S. to E.S.E., force 4, during the t. and l.)—Very hazy towards evening, with red angry look in the E.S.E.
8° to 9° N.	99	A gloomy sort of haze all round.
	81	Moist humid-looking sky.
	84	Very damp.—Sun not seen below 8° on account of the thick haze.
	85	A little sheet l. to S.Ed.*
7° to 8° N.	86	Faint sheet l. in N.E.
	71	Hot smoky-looking sky.
	75	Sheet l. in N.E.
	77	Halo round sun.
6° to 7° N.	78	Thickish haze round horizon about 25° high.—A white haze hanging all round horizon (two entries).
	79	A peculiar white haze making everything on deck quite damp.
	61	Many waterspouts from a half mile to five miles off.
	62	Heavy mist throughout the day.
	65	Sheet l., very heavy mist.
	67	Very hazy contracted horizon.
5° to 6° N.	69	Dense gloomy appearance in horizon, moderately clear in zenith. Peculiar dark colour in sky at horizon.
	50	Heavy chain l.: impossible to see anything for at least ten minutes after each flash.
	52	Much electric fire dancing at mastheads and yardarms.
4° to 5° N.	54	Heavy l. sheet and forked, from S.W. to S.E. Sheet l. from N.E. through E. to S.W.—Sheet l. in S.W.—Waterspouts in N.E. of low altitude and soon dispersing.
	41	Much sheet l. all round.—Several waterspouts between E.S.E. and E.N.E.
	43	Electric storms passing from N.E. to S.W.; forked l. very vivid, of a reddish purple tinge.—Faint sheet l.
	45	Sheet l. in S.E.—Sheet l. to Sd.
3° to 4° N.	46	Sheet and forked l. all round.—Forked l. to N.Ed.
	47	Thunder and lightning: intervals between flash and report three to eight seconds. This storm went from N.E. to N.W. and returned to N.
	30	l. in N.N.E. "Corposants" at mastheads during the first squall, looking like small stars.
	33	Sheet l. in N.E.
2° to 3° N.	35	A heavy waterspout.
	36	Sheet l. in various directions.
	37	Frequent sheet l.
	22	Sheet l. in N.N.E.
1° to 2° N.	23	Forked and sheet l., mostly sheet (two entries).
	25	Sheet l. in S.W., W., N.W., and N.E.—Heavy sheet l. from E. and N.E.
	26	Sheet l. in N.W.—l. all round for six hours.
	27	A large waterspout partially formed.
	28	Halo round the sun.
	10	Much sheet l. in N.E. (two entries).—Forked l. and heavy t. (two entries).
0° to 1° N.	13	An immense waterspout formed to Nd. about half-a-mile off. It moved very slowly to Sd. and lasted about 15 minutes, revolving from right to left.
	18	Heavy l. of all kinds.
	03	Sheet l. to N.N.E.

* "To S.Ed." has the same meaning as "in S.E." sometimes a log uses one term and sometimes the other.

GENERAL REMARKS.

The following extracts have been made from the "Remarks" in various logs :

NATURAL HISTORY.

NOTE.—The remarks on Natural History are necessarily vague : sometimes because a Captain may not know the right name of a bird, fish, or other creature seen : at other times from his having an indistinct view of it ; still they have been thought worthy of extraction. In many cases the geographical position of such creatures has a value independent of their names.

Latitude.	Sub-square.	Remarks on Natural History.
<i>Land Birds and Insects.</i>		
6° to 7° N.	64	A swallow.
"	65	Caught a snipe much exhausted.
5° to 6° N.	53	A swallow caught on the 5th, let loose on the 7th, flew to the Ed. (Ship from N.)
3° to 4° N.	35	A small kind of moth of a brownish colour flew on board.
0° to 1° N.	01	Caught a land bird something like a lark.
<i>Cetacea.</i>		
8° to 9° N.	85	Two large sperm whales heading to N.Wd.
5° to 6° N.	56	Finbacks.
4° to 5° N.	45	Two small cetacea going W.
"	47	Seven sperm whales going to the N.Wd.
3° to 4° N.	38	Numerous black fish.
0° to 8° N.	-	Porpoises were seen in sub-squares 70,* 76, 41, 43, 38, 23, 16, 04, and 06. In s.-s. 23 is the following remark : "Many small porpoises leaping high and heading to the S.Wd.," in 06 they were going to the S.Ed., in 16 to the Ed. and in 76 to the S.Wd.
<i>Fish, &c.</i>		
1° to 6° N.	-	<i>Albicores</i> were seen in s.-ss. 52, 19, very large in 52.
0° to 10° N.	-	<i>Bonitos</i> " " 97, 50, 32, 10 (four times), 15, 09.
1° to 6° N.	-	<i>Dolphins</i> or <i>Coryphæna</i> " 51, 53 (twice), 43 (twice), 23, 19.
0° to 10° N.	-	<i>Flying Fish</i> " " 24 sub-squares. They were very abundant in s.-ss. 50 and 15.
1° to 5° N.	-	<i>Skipjacks</i> " 47 and 18.
0° to 5° N.	-	<i>Sharks</i> " " 43, 19, 07, 08, in 07 one 5ft. long was caught.
0° to 10° N.	-	<i>Portuguese-men-of-war</i> " 97, 52, 55, 43, 02 and 80 : they were large as well as abundant in 52.
<i>Sea Birds.</i>		
0° to 10° N.	-	<i>Stormy Petrels</i> , or <i>Mother Carey's Chickens</i> , were reported 25 times : abundant or very abundant in s.-ss. 32, 14, and 26
0° to 4° N.	-	<i>Birds</i> (supposed to be sea birds) were reported 16 times : abundant or very abundant in s.-ss. 382 4 09, and 08, the last two were near St. Paul's Rocks.

* A dot under a sub-square indicates that the creatures were abundant there, two dots that they were very abundant.

FALLING STARS.

There are 11 entries of Falling Stars, distributed over six years between 1857 and 1871 : of these four were in 1868, three in 1860, whilst in no other year were more than one recorded. The following remarks give the dates, &c. when they were numerous.

Sub-square.	Hour.	Day.	Year.	Remarks on Falling Stars.
88	?	8th - 9th	1859	During the night stars shooting from S. to N.
44	8 p.m.	1st	1860	Stars shooting from N.E. to S.W.
33	10 p.m.	3rd	"	" to S.W.
07	8 p.m.	5th	"	" from S.W. to N.W.
55	10 p.m.	14th	1868	Shooting stars from N.E. to S.S.W.
54	10 p.m.	28th	1871	Several stars falling to the N.

TEMPERATURE OF RAIN AND AIR.

	Sub-square.	Temperature of Rain.	Temperature of Air.
	64	69°·3	72°
	51	74	76
	46	74	75
	36	74·5	76·1
	10	74·5	76·2
	13	73	74·6
	14	75·3	76·5
	06	74	75
	07	73	77
	07	76	79
		10) 37·6	57·4
		73·76	75·74 Difference 2°·0

Latitude.	s.-s.	VARIOUS.
9° to 10° N.	96	13th, 1862. All the sails and ropes red. (Ship from Nd.)
	98	25th, 1868. Yellowish red dust settling on the sails. (Ship from Nd.)
8° to 9° N.	84	22nd, 1868. Sails covered with the fine African dust. (Ship from Sd.)
7° to 8° N.	73	25th, 1859. The red dust still continues to fall. I observe that the deposit is much greater on the higher sails (royals, &c.) than on the lower.* (Ship from Nd.)
	74	1st, 1863. Observed the sails and rigging to be covered with brown or reddish dust or sand. (Ship from Nd.)
	78	3rd, 1856. Rigging partially covered, on the weather side, with a very fine red dust, lying more thickly aloft than below: wind N.Ely. and warm. (Ship from Nd.)
4° to 5° N.	44	15th, 1866. Our sails quite coloured red with African dust: wind N.E. (Ship from Nd.)
0° to 1° N.	09	1 p.m. 25th, 1859, St. Paul's Rocks bearing N.W. by N. by compass, distant about 10 miles, experienced a severe shock of an earthquake. It commenced with a rumbling noise like distant thunder and lasted about 40 seconds. During the first part (? of the day) there was a small confused sea, but after the earthquake a heavy swell from N.N.E. I am perfectly familiar with earthquakes, having experienced many on the west coast of America, but I never felt one so severe as this. Glasses and plates that were on the table jingled to a great extent: several articles were shaken off the after hatch, and the ship felt as if grinding heavily on a reef of rocks, which idea found general belief, for the cry of 'The ship's ashore' burst simultaneously from the lips of all on board, and the watch below came tumbling up in great haste. I must confess that I was very much startled, and ran to the side to look for bottom, but soon remembered what it was, and allayed the panic by explaining that 'twas only an earthquake. It will be found that another earthquake was experienced in October of the same year, in nearly the same place.

BEST ROUTES FOR CROSSING THE EQUATOR.

To assist the Navigator in deciding as to the best route for crossing the Equator, Appendices B and C have been given. The first contains the wind data of Square 39 (which lies to the Nd. of SQUARE 3); it has been divided into En. and Wn. strips of 5° of longitude by 2° of latitude. The other gives the En. half of Square 303, but in much more detail, as it contains Cape St. Roque, and is of very great importance to Navigators.

* Perhaps the reason why the upper sails collected more dust than the lower may have been that they are made of much lighter canvas, and do not flap so heavily as the lower sails. This reason does not however account for its being thicker on the rigging aloft than below. (See remarks on s.-s. 78.)

By meaning the mean forces of all winds in the Tables of Appendix B. for January, it is shown that the mean force of all winds is pretty nearly the same in both halves of Square 39. Appendix B. also shows that S.Ely. winds are common to the Nd. of the Cape Verd Islands, but are not so frequent to the Sd. of them; this is more especially shown in the En. half of the square.

The following Table will be useful by showing the Navigator the three prevailing points from which the wind blows in each quarter, for each half of the square. For instance, he will learn that the N.Ely. wind of the Wn. half of Square 39 is more Ely. than that of the En. half; also that the S.Ely. wind in both halves is chiefly East, and scarcely ever to the Sd. of E.S.E.

TABLE 12.

The Direction of the three Prevailing Winds of each quarter of the compass, in each half of Square 39. They are in the order of their prevalence. A dash under a letter or figure indicates extreme prevalence.

Latitude.	N. to E. b. N., or N.Ely. Winds.		E. to S. b. E., or S.Ely. Winds.		S. to W. b. S., or S.Wly. Winds.		W. to N. b. W. or N.Wly. Winds.	
	Wn. half. 25° to 30° W.	En. half. 20° to 25° W.	Wn. half. 25° to 30° W.	En. half. 20° to 25° W.	Wn. half. 25° to 30° W.	En. half. 20° to 25° W.	Wn. half. 25° to 30° W.	En. half. 20° to 25° W.
	Points from North.	Points from North.	Points from South.	Points from South.	Points from South.	Points from South.	Points from North.	Points from North.
18° to 20° N.	4, 6, 5	4, 6, 2	8, 7, 6	8, 6, 5	7, - -	- - -	6, 2, 1	6, 1, 3
16° to 18° N.	4, 5, 6	4, 7, 2	7, 8, 6	8, 7, 6	- - -	S., - -	7, 6, 2	- - -
14° to 16° N.	4, 6, 5	3, 2, 7	8, 7, 6	8, - -	- - -	- - -	2, - -	- - -
12° to 14° N.	6, 5, 7	3, 6, 4	8, 7, 6	8, - -	- - -	- - -	6, - -	1, - -
10° to 12° N.	5, 4, 6	4, 2, 3	8, 7, 6	8, - -	- - -	- - -	- - -	1, - -

The accompanying Chart for January, and the prevailing-wind-arrows on the small diagram in its lower right-hand corner, show that from 10° to 4° N. the prevailing wind is N.Ely., being much stronger on the Wn. than on the En. side of the square.

Before consulting the Chart read the last paragraph on p. 9 which precedes the Remarks for January.

The Chart and Diagram also show that from 4° to 0° N. the prevailing wind is S.Ely., being very uniform in direction but a little stronger on the Wn. than on the En. side of the square. They also show that a moderate Wly. current prevails in the Nn., and a stronger Wly. current in the Sn. part of the square, whilst an Ely. current prevails between 4° and 6° N. on the En. side of the square.

Appendix C shows that in Square 303, in January, the prevailing winds between 30° and 33° W. are more Sly. than those between 33° and 35° W. This is best shown

by running a pencil line down each table, making it pass through the largest percentage for each degree of latitude. It will be seen at once that this line is further to the right in the En. than in the Wn. part.* By meaning the ten points of the compass, each line passes through, it is shown that the mean direction of prevailing winds in the En. part is S.E. $\frac{1}{2}$ E., whilst that in the Wn. is E.S.E.; it is also shown that the mean force of *prevailing* winds in the En. part is 4.4, whilst that in the Wn. part is only 3.9; so that the Wn. part has the *Direction* of Wind most favourable for the Outward-bound ship, but the En. part has most *Force* of Wind. By meaning the wind forces in the left-hand column of each table, we find that the mean force of all winds is 4.1 in the En. part and only 3.7 in the Wn. It will also be noticed that between 0° and 1° S. there are 19 per cent. of calms in the Wn., and only 3 in the En. part. The Navigator is advised to draw the above-named pencil lines, and work out similar mean forces and directions for each month, so that a mere inspection of the lines and means will show him in which part he will have the most favourable and the strongest winds.

The above facts seem to show that the *Outward-bound* ship should pass outside the Cape Verd Islands in January, for although the wind is equally strong inside, she will be in a better position for steering to the Sd. on the Wn. side of Square 3, where there is a stronger N.Ely. wind than on the En. side. The Navigator must however bear in mind that he will have a strong Wly. current after passing to the Sd. of 4° N., and must consider the sailing qualities of his ship. With the January Chart and Appendices B and C before him, he has all the data for forming a correct judgment. The current remarks for s.-s. 09 show that on the 25th January the "Florence Nightingale," Capt. James Gales (the ship which had the earthquake) had a Wly. current of two miles an hour near St. Paul's Rocks. The same ship's log shows that she crossed the Equator between 29° and 30° W., and averaged 2° a day to the Sd., clearing Cape St. Roque after making two tacks to the Ed. one lasting four, the other two, hours. She had the wind veering from S.E. by E. to S.E. by S. (true) down to 3° S., whence it averaged about S.E. by E. The swell was N.Ely. down to 7° South, with a short S.Ely. sea at the same time. In 1° S. she had a quick N.N.E. swell and high short S.S.E. sea, causing a very bad confused sea. The current was Wly. and averaged about one mile an hour down to 5° S., when it decreased and became more Sly. The weather was unsettled and squally down to 3° S., afterwards fine.

The *Homeward-bound* ship should avoid closing with Cape St. Roque, where the winds are lighter than further to the Ed., and she should cross the Equator to the Wd. of 25° W.

* Throughout the year observations are very scarce in 0° to 5° S. and 33° to 35° W.

FEBRUARY.

Barometer.—The red isobar (see the lower right-hand corner of the Chart) shows that the lowest pressure is now in the Southern part of the square, ranging across it in about 2° N., where also the temperature of both air and sea is highest. The lowest mean pressure in the lateral strips (29.932) lies between 0° and 2° N., whilst the highest (29.964) is between 9° and 10° N. The greatest increase of pressure in these strips since January (.018) has taken place between 4° and 5° N., where the Doldrum then was, now it has moved to the Sd., and there has been a slight decrease of pressure (.002) between 0° and 1° N.

The mean of the means in the lateral strips (29.944) indicates that the mean pressure of the square has increased .007 since January. A comparison of the vertical strips for both months shows that the pressure has increased slightly more on the En. than on the Wn. side of the square. Of those months during which the N.E. Trade prevails in SQUARE 3, February has the highest *mean* pressure, and a mean of 29.98 frequently shows in the Nn. sub-squares. This is also the month which has the coldest air and sea in the Nn. part of the square.

The Diagram of isobars and wind arrows shows the relation of the wind's direction and force to the mean pressure for the square. When compared with that for January it also shows the Sn. advance, increase of force, and more Nly. direction of the N.Ely. wind which accompany the increased pressure coming in from the N.; also that the prevailing Sly. wind has retreated 2° to the Sd. and decreased in force owing to the Sn. march of the zone of lowest pressure, or rather to the filling up of the zone of lowest pressure which existed in January, by the influx of air from the N., leaving that for February 3° nearer the Equator.

Air Temperature.—The air isotherms show a great decrease of temperature in the Nn. and increase in the Sn. part of the square since January; the change ranges from -1° 8 between 9° and 10° N. to -0° 1 between 5° and 6° N. from which zone it gradually increases to +1° 5 between 0° and 1° N. The Mean Temperature of the whole square (78° 4) has not changed since January, though it has been shown that great internal changes have taken place in the square. It will be seen that the case is similar with the sea.

Dry and Damp Bulbs.—The least difference between dry and damp bulbs shown by the lateral strips is 3° 2; it is found between 1° and 4° N.; the greatest difference (4° 3) is variously distributed between 5° and 10° N.

The means in vertical strips show a greater difference on the Wn. than on the En. side of the square. This was not the case in January. The mean of the means in the lateral strips (3° 8) shows an increase of 0° 4 since January, which is pretty evenly distributed throughout the square, though the greatest increase (0° 8) is between 5° and 6° N., and there has been a decrease of 0° 1 between 8° and 9° N.

Sea Temperature.—The sea isotherms show changes similar to those of the air. The lateral strips of 1° data show that the change since January ranges from -1° 5 between

9° and 10° N. to 0 between 4° and 5° N., from which zone it gradually increases to +1°·0 between 0° and 2° N. By comparing these differences with the corresponding ones for January it will be seen that the decrease in the N. has not been so great, whilst the increase in the S. has been greater than what took place between December and January, indicating the effect of the sun's Nn. progress. The vertical strips show that the temperature of the sea has slightly increased in the En. and decreased in the Wn. half of the square since January; this may be due to the greater strength of the N.Ely. wind on the Wn. side of the square. Similar changes are shown in the temperature of air on the two sides of the square. The Mean Sea Temperature of the whole square (79°·2) has scarcely changed since January, notwithstanding the internal changes given above. The coldest air isotherm (75°) and sea isotherm (76°), due to the influence of the N.E. Trade, are experienced in this month. The mean air temperature in s.-ss. 95 and 96 is as low as 74°, whilst that of the sea in s.-s. 92 is 75°. The trend to the Sd. of the Wn. ends of the isotherms is probably due to the stronger N.E. wind on the Wn. side, and the patch of warm Ely. current on the En. side of the square.

Specific Gravity.—The lateral strip having the lowest specific gravity (1·0266) is in the Doldrums between 2° and 3° N., the highest (1·0272) is between 6° and 7° N., the mean for the square (1·0269) remains almost unchanged since January. The vertical strips indicate that the specific gravity is slightly lower on the En. than on the Wn. side of the square; more rain and less wind are experienced on the En. than on the Wn. side, which facts probably account for the position of the lower specific gravity.

WIND.

TABLE 1.—LATERAL STRIPS.

Lateral Strips. 10° of Longitude by 1° of Latitude.	No. of Observations.	Mean Force of Strip.	N. to E. by N. or N.Ely.		E. to S. by E. or S.Ely.		S. to W. by S. or S.Wly.		W. to N. by W. or N.Wly.		Variables.		Calms.	Prevailing Wind.		Strongest Wind.	
			%	Mean Force.	%	Mean Force.	%	Mean Force.	%	Mean Force.	%	Mean Force.		No. of Observations. Direction.	Mean Force.	No. of Observations. Direction.	Mean Force.
9° to 10° N. -	123	4·6	96	4·6	1	5·0	—	—	3	3·4	—	—	—	N.E. ³⁰ by N.	4·6	E. by N. ⁵	5·4
8° - 9° N. -	129	4·3	97	4·3	1	3·5	—	—	2	3·0	—	—	—	N.E. ²⁸ by N.	4·5	N.E. by E. ¹⁷	4·6
7° - 8° N. -	169	4·0	90	4·2	—	—	1	1·5	8	2·1	1	2·5	—	N.E. ⁴⁵ by N.	4·3	N.E. ²⁰	4·4
6° - 7° N. -	164	4·1	91	4·2	1	4·5	—	—	8	2·5	—	—	—	N.N.E. ⁵⁰	4·2	N.E. by N. ²⁶	4·7
5° - 6° N. -	191	3·7	84	3·8	2	4·0	1	3·0	12	2·7	1	1·5	—	N.N.E. ⁴²	4·0	N.E. by N. ³³	4·3
4° - 5° N. -	245	3·2	71	3·6	5	3·3	1	2·0	16	2·5	2	2·0	5	N.N.E. ⁴⁷	3·7	N.E. by N. ²³	4·1
3° - 4° N. -	348	2·6	51	3·2	9	2·8	3	2·6	15	2·6	14	1·8	8	N.E. by N. ³⁷	3·2	E. by S. ⁴	4·3
2° - 3° N. -	409	2·1	29	2·7	26	2·3	5	1·9	14	2·4	15	1·9	11	N.E. ²³ by N.	2·9	E. by N. ¹³	3·3
1° - 2° N. -	325	2·4	23	2·6	37	2·8	12	2·5	11	2·6	10	1·9	7	S.E. ²⁷	2·8	S.S.E. ¹⁶	3·4
0° - 1° N. -	331	2·2	10	2·9	52	2·7	12	2·2	6	1·8	10	1·7	10	S.E. by E. ³²	2·7	N. by E. ⁴	4·3

TABLE 2.—VERTICAL STRIPS.

Vertical Strips. 10° of Latitude by 1° of Longitude.	No. of Observations.	Mean Force of Strip.	N. to E. by N. or N.Ely.		E. to S. by E. or S.Ely.		S. to W. by S. or S.Wly.		W. to N. by W. or N.Wly.		Variables.		Calms.	Prevailing Wind.		Strongest Wind.	
			%	Mean Force.	%	Mean Force.	%	Mean Force.	%	Mean Force.	%	Mean Force.		No. of Observations. Direction.	Mean Force.	No. of Observations. Direction.	Mean Force.
20° to 21° W.	285	2·5	33	3·0	15	2·7	10	2·4	22	2·9	13	1·8	7	North. ²¹	2·8	N.E. ⁶	4·0
21° - 22° W.	301	2·7	37	3·1	22	2·6	10	2·7	18	2·7	9	2·1	4	North. ²⁹	3·2	E. by S. ⁴	3·6
22° - 23° W.	330	2·5	37	3·4	24	2·3	5	2·2	17	2·2	11	1·8	6	N.N.E. ²⁵	3·5	N.E. by N. ¹⁹	3·9
23° - 24° W.	311	2·7	51	3·3	22	2·8	4	1·8	9	2·0	7	1·4	7	N. by E. ³⁹	3·4	E. by N. ⁴	3·8
24° - 25° W.	277	3·2	58	3·9	20	2·8	3	1·8	8	2·4	4	2·0	7	N.N.E. ⁴⁰	3·8	N.E. by N. ³²	4·3
25° - 26° W.	252	2·9	59	3·7	19	2·3	3	2·0	5	2·4	4	2·8	10	N.N.E. ³⁵	3·5	N. by E. ³⁴	4·1
26° - 27° W.	234	3·3	66	4·0	15	2·8	3	1·6	4	1·6	6	1·9	6	N.E. by N. ³⁷	4·2	N.E. by N. ³⁷	4·2
27° - 28° W.	154	4·1	80	4·4	10	3·5	1	5·0	2	2·2	6	1·2	1	N.N.E. ³⁶	4·3	N.E. by N. ³⁵	5·0
28° - 29° W.	137	3·9	86	4·1	10	3·2	—	—	—	—	3	1·6	1	N.E. ⁴⁰ by N.	4·0	N.E. by E. ¹²	4·3
29° - 30° W.	153	3·3	57	4·2	18	3·1	3	2·6	4	2·6	12	1·9	6	N.E. by N. ³⁵	4·2	N.E. ¹⁵	4·9

* More than half of these calms were in sub-square 25.

The above tables are similar to those for January; by comparing the means of the per-centages in the *lateral* strips (Table 1) with those for January we get the following result for the whole square:—

N.E. wind 64 % and increased about 11 % since January.
S.E. „ 13 „ and decreased „ 13 „ „
S.W. „ 4 „ not changed „ „ „
N.W. „ 10 „ and increased „ 6 „ „
Variables 5 „ and decreased „ 2 „ „
Calms 4 „ „ 2 „ „

The Mean Force for the whole square (3·3) has scarcely changed since January, but the internal changes show that the N.E. wind has very decidedly increased in force between 4° and 6° N., whilst the S.E. has lost to the same amount between 0° and 3° N., the change of force amounting to about a mile an hour in the speed of Beaufort's ship.

A comparison of the prevailing winds of February with those of January (see Diagrams in the lower right-hand corners of the Charts) shows that the N.E. Trade has pressed 2° to the Southward and become more Nly. since January; also that it is much stronger and more Ely. on the Wn. than on the En. side of the square.

Table 2 shows that both the N.E. and S.E. winds are stronger on the Wn. than on the En. side of the square, but more especially the N.E.; also how much more N.Wly. wind there is on its En. than on its Wn. side. These facts are well shown by the relative lengths of the wind arrows on the small isobaric Diagram and by the vertical strips at the bottom of the published 2° Chart.

TABLE 3.

Latitude.	s.-s.	Winds, Force 7 or upwards, but not Squalls.	Direction of Squalls and heavy Squalls.										s.s.	REMARKS.																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																	
			(All Squalls Force 7 or upwards are considered to be heavy.) (All Squalls on either side of N., S., E., or W., are given to their respective quarters, so that there are fewer from the above-named points than from the quarters.)																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																												
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NOTE.—11 of the 14 strong N.Ely. winds were on the Wn. side of the square.

All but one of the heavy N.Ely. squalls were on the Wn. side of the square, whilst the one on the En. side was between 9° and 10° N.

The heavy S.Ely. squall was on the En., and the very heavy S.Wly. one was on the Wn. side of the square.

Table 3 has been compiled from the remarks, and resembles that for January; it shows that all Steady Winds of force 7 were from the N.Ed., and that they were experienced between 5° and 10° N. Also, that all the N.Ely. gales and all but one of the heavy N.Ely. squalls were in its Wn. half, so that the remarks fully support the prevailing-wind-arrows in showing where the strongest wind lies. The remarks also show that the Sn. limit of the N.E. Trade was most frequently found between 3° and 4° N., whilst the Nn. limit of the S.E. Trade prevailed between 1° and 3° N.

CURRENTS.

TABLE 4.

LATERAL STRIPS.

Lateral Strips. 10° of Longitude by 1° of Latitude.	No. of Observa- tions.	Mean Rate.	N. to E. by N. or N.Ely.		E. to S. by E. or S.Ely.		S. to W. by S. or S.Wly.		W. to N. by W. or N.Wly.		None.	Prevailing Current.		Strongest Current.*		
			%	Mean Rate.	%	Mean Rate.	%	Mean Rate.	%	Mean Rate.		%	No. of Observations. Direction.	Mean Rate.	Direction.	Rate.
9° to 10° N.	23	10	—	—	9	8	26	17	35	13	30	W. ⁴	15	S.W.	50	
8° - 9° N.	27	12	—	—	19	12	41	14	18	20	22	W. by S. ³	21	W.	47	
7° - 8° N.	31	11	3	6	23	16	35	16	13	13	26	W.S.W. ⁶	21	W.S.W.	59	
6° - 7° N.	29	11	14	12	10	14	28	15	31	13	17	S.W. by S. ²	16	W. by N.	35	
5° - 6° N.	34	14	3	10	15	16	35	23	24	14	23	W. by S. ³	33	S.W.	56	
4° - 5° N.	42	12	12	13	26	17	14	15	19	21	29	W. ⁴	24	W.	28	
3° - 4° N.	40	12	5	23	15	12	33	14	27	17	20	W.S.W. ⁵	18	E. by N.	38	
2° - 3° N.	44	16	11	12	4	11	39	13	39	24	7	W. ⁷	15	N.W. by N.	68	
1° - 2° N.	42	17	10	12	2	30	26	23	45	21	17	W. ¹⁰	18	N.W. by W.	50	
0° - 1° N.	45	18	4	16	—	—	29	23	42	24	25	N.W. by W. ⁶	19	W.N.W.	58	

* The strongest Current in each Strip is here given, as it is important to the Navigator to know the extreme to which he is liable.

TABLE 5.—VERTICAL STRIPS.

Vertical Strips. 10° of Latitude by 1° of Longitude.	No. of Observa- tions.	Mean Rate.	N. to E. by N. or N.Ely.		E. to S. by E. or S.Ely.		S. to W. by S. or S.Wly.		W. to N. by W. or N.Wly.		None.	Prevailing Current.		Strongest Current.*	
			%	Mean Rate.	%	Mean Rate.	%	Mean Rate.	%	Mean Rate.		No. of Observations. Direction.	Mean Rate.	Direction.	Rate.
20° to 21° W.	42	16	12	19	29	16	26	21	21	19	12	⁴ S.	17	W. by N.	58
21° - 22° W.	37	11	5	22	16	14	19	17	30	16	30	³ N.W.	17	N.W. by N.	27
22° - 23° W.	38	12	13	11	13	14	29	14	19	27	26	⁴ S.W.	8	N.W. by N.	68
23° - 24° W.	45	13	4	8	7	14	31	14	38	19	20	⁷ W.	20	N.W. by N.	53
24° - 25° W.	47	12	8	9	11	18	38	16	15	23	28	⁵ W.S.W.	21	N.W. by W.	50
25° - 26° W.	28	14	—	—	7	11	25	25	47	16	21	¹⁰ W.	17	W.S.W.	59
26° - 27° W.	43	13	7	12	9	12	33	15	37	18	14	⁴ W. by S.	19	W. by N.	35
27° - 28° W.	31	15	6	14	6	9	36	21	26	25	26	⁵ W.S.W.	17	S.W.	50
28° - 29° W.	23	16	4	7	9	15	35	17	39	23	13	³ W.S.W.	17	N.W. by N.	33
29° - 30° W.	23	15	—	—	4	23	31	21	48	17	17	⁷ W.	14	W.S.W.	42

Tables 4 and 5 are similar to those for January. Table 4 shows that Wly. currents prevail in the Nn. and Sn. parts of the square, whilst Ely. prevail between 4° and 5° N.; these facts are fully borne out by the Remarks which mention none but Ely. currents between 4° and 5° N., where there is also the largest amount of current ripple. Table 4 also shows that the Wly. current near the Equator is stronger than that in the Nn. part of the square.

Table 5 shows that there is much more and a stronger Ely. current on the En. than on the Wn. side of the square, whilst the reverse is the case with Wly. currents.

The following remarks are considered worthy of extraction:—

Latitude.	Sub-square.	Remarks from Logs.	
		NOTE.—A bar, thus —, separates the Remarks from different Logs.	
9° to 10° N.	91	Passing through patches of very strong rippings which cause the sea to boil up with crests and heaving spray; some of these patches are not more than 200 yards in their greatest dimensions, the sea being quite smooth all round them.	
8° - 9° N.	82	Strong rips, but no perceptible current.	
7° - 8° N.	72	Sea much agitated by rippings or overfalls apparently in irregular lines, and nearly at right angles to the wind; wind N.N.E.	
4° - 5° N.	42	Ripples on the water from the S.Wd.; wind variable Nly.—Tide rips extending longitudinally from E. to W. with calm spaces between, but so close that the one passed could be heard boiling to leeward whilst the one approaching could be heard to windward. This continued throughout the day; wind N.N.E.	
3° - 4° N.	38	A short ripple from S.E.	
0° - 1° N.	00	Sea low, but very noisy with rippings toppling over to the N.Wd.; wind E. by N.	

* The strongest Current in each Strip is here given, as it is important to the Navigator to know the extreme to which he is liable.

SEA.

The Remarks show that the sea was “extremely luminous” once, and “very luminous” five times between 7° and 10° N.; it was “very luminous” twice between 2° and 4° N. There are 21 entries of “deep blue” sea between 0° and 8° N., they are chiefly between 1° and 5° N.

Latitude.	Sub-square.	Remarks from Logs.	
		NOTE.—A bar, thus —, separates the Remarks from different Logs.	
1° to 2° N.	17	Nly. swell 18 to 20 feet high.	
0° - 1° N.	06	While becalmed, before the moon rose, the sea was luminous, the mollusca were large and brilliant, lying wide apart, studding the ocean like bright stars.— Passed through a line of scum or spawn extending N.E. by E. and S.W. by W. about 3 miles; wind W. by S. 1.	

The Eastern and Western strips on the Chart show that the Nly. and N.Ely. swells prevail to the Equator, in spite of the prevalent Sly. wind between 0° and 2° N.

CLOUDS.

Tables 6, 7, and 8, with the remarks on Clouds, are compiled from the data for 1° sub-squares.

TABLE 6.—LATERAL STRIPS.
PER-CENTAGES of EACH FORM, and MEAN AMOUNT of all CLOUDS.

Lateral Strips. 10° of Longitude by 1° of Latitude.	No. of Observa- tions.	Upper Clouds.			Lower Clouds.				Amount, 10 being “completely Clouded.”	
		Cir.	Cir.-c.	Cir.-s.	Cum.	Cum.-s.	Str.	Nim.	No. of Obs.	Mean.
		%	%	%	%	%	%	%		
9° to 10° N. -	63	13	16	14	57	8	10	0	86	5.0
8° - 9° N. -	71	17	14	8	56	6	17	3	94	4.7
7° - 8° N. -	82	7	21	9	62	7	5	2	115	5.1
6° - 7° N. -	89	11	17	10	57	4	10	6	117	4.7
5° - 6° N. -	104	13	12	12	63	9	6	8	140	4.8
4° - 5° N. -	151	11	14	5	62	12	7	17	185	5.7
3° - 4° N. -	181	6	13	10	40	27	10	30	247	7.0
2° - 3° N. -	214	8	10	6	43	20	7	37	268	6.7
1° - 2° N. -	200	6	12	6	43	17	13	34	231	6.6
0° - 1° N. -	186	13	6	6	53	18	8	24	232	6.0

TABLE 7.—VERTICAL STRIPS.

PER-CENTAGES of EACH FORM, and MEAN AMOUNT of all CLOUDS.

Vertical Strips. 10° of Latitude by 1° of Longitude.	No. of Observa- tions.	Upper Clouds.			Lower Clouds.				Amount, 10 being "completely Clouded."	
		Cir.	Cir.-c.	Cir.-s.	Cum.	Cum.-s.	Str.	Nim.		
		%	%	%	%	%	%	%	No. of Obs.	Mean.
20° to 21° W.	178	9	12	7	46	27	6	29	217	5.8
21° - 22° W.	201	9	10	8	54	21	5	29	229	6.0
22° - 23° W.	190	13	11	13	44	14	5	26	211	5.8
23° - 24° W.	143	10	10	10	51	10	8	20	184	5.4
24° - 25° W.	129	16	9	5	57	9	5	15	179	5.9
25° - 26° W.	116	12	10	3	53	7	9	19	179	6.0
26° - 27° W.	140	6	17	9	46	15	19	18	187	5.7
27° - 28° W.	82	10	20	5	50	12	15	15	108	6.3
28° - 29° W.	80	8	15	5	63	11	15	16	105	6.2
29° - 30° W.	82	2	11	11	59	15	13	11	116	6.6

By taking the mean of the ten strips in Table 6 it is shown that the Mean Amount of all Clouds (5.6) and per-centage of Nimbus have considerably decreased since January; on comparing the data in the different strips we find that this decrease lies mainly to the Nd. of 4° N. Between 4° and 7° N. the average decrease for each strip is 1.3 in Amount of Cloud, and 15 in per-centage of Nimbus.

Table 7 compared with that for January indicates that the decrease in Amount of Cloud is chiefly on the En. side of the square, and there is now rather more cloud on its Wn. than on its En. side. The greatest decrease in the per-centage of Nimbus is between 24° and 25° W., so it seems that there is much less cloud in the central part of the square in February than there was in January. We have, however, still much more Nimbus and Cumulo-stratus (unsettled weather clouds) in the En. than in the Wn. half of the square.

TABLE 8.

The following table is derived from the Remarks on Clouds in February:—

NOTE.—All cloud entries from N. to E. b. N. inclusive have been given to the N.En. quarter.
" E. b. S. to S. " S. En. "
" S. b. W. to W. b. S. " S. Wn. "
" W. b. N. to N. b. W. " N. Wn. "

Upper clouds from E. or W. have been extracted in the remarks. Lower clouds flying with the wind have not been recorded.

Quarters from which the Clouds and Wind came.		Lower Clouds.			Clouds (doubtful whether upper or lower).			Upper Clouds.		
Clouds from.	Wind from.	Total No. of Observa- tions.	No. in Nn. Half of Square.	No. in Sn. Half of Square.	Total No. of Observa- tions.	No. in Nn. Half of Square.	No. in Sn. Half of Square.	Total No. of Observa- tions.	No. in Nn. Half of Square.	No. in Sn. Half of Square.
N.En.	N.En.	—	—	—	—	—	—	7	4	3
"	S.En.	—	—	—	3	—	—	11	—	11
"	S.Wn.	—	—	—	—	—	—	2	—	2
"	N.Wn.	—	—	—	1	—	1	3	—	3
"	N.	—	—	—	1	1	—	1	—	1
"	S.	—	—	—	2	—	2	5	—	5
"	E.	—	—	—	1	—	1	4	—	4
"	W.	—	—	—	1	—	1	—	—	—
		—	—	—	9	1	8	33	4	29
S.En.	N.En.	3	—	3	5	2	3	36	14	22
"	S.En.	—	—	—	—	—	—	11	—	11
"	S.Wn.	—	—	—	1	—	1	1	—	1
"	N.Wn.	—	—	—	4	—	4	5	1	4
"	N.	1	—	1	2	—	2	6	2	4
"	S.	—	—	—	1	—	1	—	—	—
"	E.	—	—	—	1	—	1	—	—	—
		4	—	4	14	2	12	59	17	42
S.Wn.	N.En.	—	—	—	3	3	—	36	26	10
"	S.En.	—	—	—	1	—	1	2	—	2
"	S.Wn.	—	—	—	—	—	—	1	—	1
"	N.Wn.	1	1	—	6	1	5	5	3	2
"	N.	—	—	—	1	1	—	3	2	1
"	E.	—	—	—	—	—	—	1	1	—
		1	1	—	11	5	6	48	32	16
N.Wn.	N.En.	—	—	—	2	—	2	1	1	—
"	S.En.	—	—	—	1	—	1	2	—	2
"	N.Wn.	—	—	—	—	—	—	1	—	1
"	N.	—	—	—	1	—	1	2	2	—
		—	—	—	4	—	4	6	3	3

NOTE.—The following are the per-centages of upper clouds from the various quarters, 146 being the total number of observations.

From the N.En. quarter 23% being + 3% since January.
" S.En. " 40 " " + 3 " "
" S.Wn. " 33 " " — 4 " "
" N.Wn. " 4 " " — 2 " "

The number of observations on the motion of upper clouds has decreased in the Nn. and increased in the Sn. half of the square since January, especially in the cases of those from N.E. and S.E. The above per-centages show that upper clouds from Sly. directions are still much more common than those from Nly. Even between the Equator and 2° N., where the S.E. Trade prevailed, there were nearly as many upper clouds from S.E. as from N.E.

In the Nn. half of the square the largest number of upper clouds was from the S.Wd., wind N.Ely., whilst in the Sn. the largest number was from the S.Ed., wind also N.Ely.

Table 8 and its note speak for themselves. Of the 36 entries of upper clouds from the S.Ed. when the wind was N.Ely. 23 were noticed between 3° and 6° N., and only 9 between 6° and 10° N. Again, of the 36 entries of upper clouds from the S.Wd. when the wind was N.Ely. only 9 were noticed between 5° and 8° N., whilst there were 17 between 8° and 10° N. Here is another proof that the upper clouds move from a S.Ely. quarter at the Sn. verge of the N.E. Trade, and gradually draw from the S.Wd. as they advance to the Nd. The lower winds of July and some following months change in the same way. See the arrows of *prevailing* winds for those months in the lower right-hand corners of their respective charts.

The following remarks on Clouds seem worthy of extraction :—

Latitude.	Sub-square.	Remarks from Logs. NOTE.—A bar, thus —, separates the Remarks from different Logs.
8° to 9° N.	87	Three distinct strata of clouds (cir.-c., cir.-s., cum.) ; that moving with the wind was very low, and apparently heavily charged with moisture, the upper were from the S., wind N.N.E.
7° - 8° N.	74	Clouds very confused.
6° - 7° N.	60	Dark heavy passing clouds settling down to the Nd., wind Nly.
	63	Cum. growing very thin and fleecy; the clouds to the Sd. rise till in the zenith, when they gradually melt away; a steady Trade from N. by E.
	66	Cir.-s. from S.W. by S. Str. from N.E. by N., wind N.
5° - 6° N.	51	Upper clouds from N.W., lower from the Sd., wind N.—Banks of tufted cum. showing to the Sd., wind N.
	52	Upper clouds from N.W., lower from Sd., wind N.—Cir. from S.S.W., lower clouds from N.N.E., wind variable.—Clouds beginning to form in masses betokening the loss of the N.E. Trade.
	53	Heavy nim. in S.S.W. and S S.E., wind N.N.E.
4° - 5° N.	42	A thin white vapour flying fast from E.S.E. above the cir.-c., wind N. by E. 5.—Cir.-c. from S. by E., cum. from E. by N., wind N. by E.—Cir.-c. from E., wind N.N.E.—Cir.-c. from N.E. by E., no wind.*
	43	A thin vapour flying fast over the stars from E.S.E., wind N.N.E.
	44	Cir.-c. from E., wind N.
	45	A heavy bank of black clouds passed over from N.N.E., no wind with it, but it was followed by a brisk breeze; as soon as it had passed to leeward two waterspouts descended from it, and a whirlwind was seen on the water, all less than half a mile from the ship, wind N.Ely.
	46	Cir.-c. from S.W. by S., lower clouds from S.S.E. and various directions, wind N.E. by E.
	47	Cir.-c. quite low, passing rapidly from S.E. by S., wind N.N.E. 4.
3° - 4° N.	30	4 a.m. Clouds coming up from the Sd., but before reaching the ship repelled by the Nly. wind, and settling in the S.S.W. with t and sheet l. The sun rose in a heavy mountainous cloud, its tops snow white, having the edges tinted red; also a quantity of cir.-s. in streaks. 10 a.m., heavy mountainous clouds from E.S.E. and Nd., having a squally appearance, but before reaching the ship they broke and dispersed to the S.S.W. and N.W.
	31	Heavy masses of leaden looking clouds to Sd. Clouds from S.W., N.E., N., and W. simultaneously, wind N. by E.
	32	Heavy masses of cloud hanging sluggishly in the air, the under drift going with the wind; wind S.E. 2 to 8.—Masses of cloud floating high and passing slowly from the Ed., wind N.E. 3.

* No wind, means that it was calm.

Latitude.	Sub-square.	Remarks from Logs. NOTE.—A bar, thus —, separates the Remarks from different Logs.
	33	Sky completely covered with small cir. and haze, whilst to the N.E., S.E., and S.W. are dense fog banks of no great height, but stationary, wind N.N.E. 6.
	39	Cir.-s. from S.E. by E., with calms and variable winds (3 entries).—Clouds from all directions, wind variable (3 entries).—Clouds from N.E. by E., no wind* (3 entries).
2° to 3° N.	21	Clouds from N.E., no wind.—Clouds from N.W., N., and E.S.E. at different altitudes, wind W.
	24	Cir. from Nd., cum. from S.E. by S., wind, variable Ely.
	25	Lower clouds from various directions, wind N.E. by N. 3 to 4.
1° - 2° N.	29	Clouds from S.E. by S., and N.E. by N., wind S. by W. (2 entries).
	19	Cir.-c. from S. by E., lower clouds from N.E. by E., wind S.E. Upper clouds from N.E. by N., lower from S. by E., wind E.S.E.
0° - 1° N.	00	Clouds from S., wind S.E.
	02	Cum. heaped in banks nearly all round the horizon. Cir.-s. from E. by N., S.E. by E., and W. by S., wind N.N.W.—Clouds quickly from S.Ed.; wind, light airs from the Nd.
	03	Cir. from Ed., wind S.E.
	06	Clouds from Ed., wind N.N.E.—A dark bank of clouds rose in the N., extending from N.E. by N. to N.W. by W., until its edge reached the zenith, the cloud to the Sd. of the ship at the same time coming from S.E. by E. and disappearing in the mass to the Nd.

WEATHER.

TABLE 9.—LATERAL STRIPS.

Lateral Strips, being 10° of Longitude by 1° of Latitude.	Thunder. (t.) %	Lightning. (l.) %	Squalls. (q.) %	Rain. (r.) %	Mist or Haze. (m.) %	Dew. (w.) %
9° to 10° N.	-	2	2	-	30	2
8° - 9° N.	-	-	2	-	33	2
7° - 8° N.	-	1	-	-	27	4
6° - 7° N.	1	3	1	2	23	1
5° - 6° N.	1	5	2	3	23	1
4° - 5° N.	4	10	5	14	17	1
3° - 4° N.	9	16	9	23	10	1 1/4
2° - 3° N.	7	11	10	26	4	3/4
1° - 2° N.	6	13	9	23	4	1
0° - 1° N.	3	8	6	14	6	1

* No wind, means that it was calm.

TABLE 10.—VERTICAL STRIPS.

Vertical Strips, being 10° of Latitude by 1° of Longitude.	Thunder. (t.) %	Lightning. (l.) %	Squalls. (q.) %	Rain. (r.) %	Mist or Haze. (m.) %	Dew. (w.) %
20° to 21° W.	5	11	6	21	14	1
21° - 22° W.	6	10	3	14	10	2
22° - 23° W.	7	11	7	22	11	$\frac{1}{3}$
23° - 24° W.	8	12	7	16	10	—
24° - 25° W.	4	9	5	13	11	—
25° - 26° W.	4	6	9	10	20	4
26° - 27° W.	2	6	5	9	24	3
27° - 28° W.	1	5	6	10	22	1
28° - 29° W.	$\frac{3}{4}$	4	9	8	12	—
29° - 30° W.	$\frac{2}{3}$	5	6	14	6	1

TABLE 11.—LIGHTNING.

This Table gives the bearing on which Lightning was seen in the various lateral strips. Only the bearings recorded as actually N., S., E., or W. have been given to those points.

Lateral Strips, being 10° of Longitude by 1° of Latitude.	Number of observations.	N.	N.Ely.	E.	S.Ely.	S.	S.Wly.	W.	N.Wly.	All round	No Direction given.
9° to 10° N.	—	—	—	—	—	—	—	—	—	—	—
8° - 9° N.	—	—	—	—	—	—	—	—	—	—	—
7° - 8° N.	—	—	—	—	—	—	—	—	—	—	—
6° - 7° N.	3	—	—	2	1	—	—	—	—	—	—
5° - 6° N.	7	—	—	1	2	1	2	—	—	—	1
4° - 5° N.	10	—	1	1	3	1	2	1	—	1	—
3° - 4° N.	22	5	3	—	2	4	2	1	—	3	2
2° - 3° N.	18	2	5	1	1	1	1	—	1	3	3
1° - 2° N.	14	3	3	1	—	—	1	2	1	1	2
0° - 1° N.	15	2	2	1	5	—	1	1	—	2	1
Total for the month and how distributed -	89	12	14	5	15	8	9	5	2	10	9

Table 9 gives the per-centages of certain exceptional weather. By taking a mean of the per-centages it is shown that there has been a general decrease in all, excepting dew, since January. But we find that with *t*, *l*, *q*, and *r* the decrease has been chiefly between 4° and 7° N., whilst they have slightly increased in some of the strips to the Sd. Mist has *increased* between 3° and 6° N., but decreased elsewhere, most in the N. Dew has increased generally, but most between 6° and 10° N., where the cold air and sea have come in. Heavy mist and dew are only seen in the Nn. half of the square. The published Chart shows that between 8° and 10° N. mist was much more abundant on the En. than on the Wn. side of the square, though this is not the case further south. Very heavy mist was experienced in s.-s. 77.

Table 10 shows that *t*, *l*, and *r* are much more frequent on the En. than on the Wn. side of the square, whilst squalls are still most frequent on the Wn. side. All heavy squalls were in the Sn. half of the square, and about one in every nine was heavy. There was only one very heavy squall; it was in s.-s. 15, and is alluded to in the Remarks of Table 3.

Table 11 shows that lightning was most frequently seen on some Sly. bearing between 4° and 7° N., whilst it was most frequent on a Nly. bearing between 0° and 4° N., indicating how its origin is at the meeting of the Nly. and Sly. winds.

The following remarks speak for themselves as they give the position and direction in which certain kinds of lightning were seen, and also important remarks on weather:

Latitude.	Sub-square.	Remarks on Weather.
NOTE.—A bar, thus —, separates the Remarks from different Logs.		
8° to 9° N.	82	Reddish hazy appearance.
	85	I have never experienced the weather so sultry and close before.
7° - 8° N.	70	Dry haze towards the horizon.
	76	The sky had a peculiar tint all day, being of a sort of brown smoky colour.
	78	Haze almost like fog.
6° - 7° N.	61	Very gloomy all round.
	67	Very hazy smoky atmosphere.
5° - 6° N.	50	A bank of thin haze encircling the horizon throughout the day at an altitude of 12°.
	52	Weather very hot and scorching in the sun's rays.
4° - 5° N.	40 & 42	Sheet lightning.
	46	Sky of a smoky brown tint.
3° - 4° N.	30	Sheet l. from N.E. to S.W.—Broad vivid sheet l. to the Sd.; flashes at intervals of half a minute to a minute.—Much sheet and forked l. with thunder.
	31	Sheet l. to the Sd. at intervals of 10 to 15 minutes.—Sheet l. in S.E., S., and S.W.
	34	St. Elmo's light seen.—Very vivid sheet l. four hours.—Very vivid sheet l. in S.W. for eight hours.—A waterspout.
2° - 3° N.	20	Lightning in zenith.—Very much sheet l. all round.
	22	Electric light on main-royal masthead, wind S.S.E. to N.N.E. with heavy t., l., and r.
	23	Very heavy flash l. with t., the l. has a double flash and is quick in succession, followed by heavy t. and showers.
1° - 2° N.	10	Vivid sheet l. in N.N.W. and N.W.
	12	Long horizontal sheet l. incessant in the N.; it was faint and about 20° above horizon. Sheet l. to the Wd.—A waterspout.
	13	Tremendous t. and l.; the latter, chain and sheet.—Sheet l. heavy at times in the N., but faint in the E. with extremely heavy rain.
0° - 1° N.	00	10 a.m., 11th, 1871. A waterspout had suddenly formed within 20 yards of the ship's stern, though its formation was not noticed. It reached the water at an angle of about 30° from the perpendicular, inclining with the wind, though it seemed almost stationary. There was a clear well defined inside space, like the bore of a cannon about 18 inches in diameter, very smooth and apparently even. Within it the water revolved rapidly, having an upward spiral motion, and looking very much like dark smoke. The revolution was contrary to that of the hands of a watch. Its diameter seemed to be about 4 feet. There was but little commotion on the surface of the water, but much in the cloud where the spout joined it. It became disconnected near the water, and rapidly receding upwards into the cloud, it soon vanished, but for some time after its disappearance much commotion and disturbance could be seen in the cloud.
	02	Much forked l. and some t. in the N.
	06	Sheet l. in various parts.
	07	Flash l. to the N.E.

GENERAL REMARKS.

The following extracts have been made from the February "Remarks" in various logs:

NATURAL HISTORY.

Latitude.	Sub-square.	Remarks on Natural History.
		<i>Land Birds and Insects.</i>
		None seen in February.
		<i>Cetacea.</i>
1° to 2° N.	19	A large <i>Grampus</i> .
8° to 9° N.	85	A large school of <i>Blackfish</i> .
1° to 2° N.	—	<i>Porpoises</i> were only seen in sub-squares 18 and 19; twice in the latter, and once going to the N.Ed.
		<i>Fish, &c.</i>
0° to 1° N.	—	<i>Albicores</i> were seen in s.-s. 03*.
0° to 10° N.	—	<i>Bonitos</i> " s.-ss. 92, 77, 63, 43, 31, 32, 06.
2° to 4° N.	—	<i>Dolphins</i> or <i>Coryphæna</i> " 31 twice, 34 and 23.
1° to 10° N.	—	<i>Flying Fish</i> were seen in sixteen s.-ss., 13 in the Nn., and 3 in the Sn. half of the square : they were abundant in 94, 98, 82, 85, 86, 76, 78, and 58. (Their greater frequency in the Nn. than in the Sn. half of the square, may arise from the fact that there is more wind there, for they are chiefly seen when there is wind enough to give a ship speed to frighten them.)
0° to 4° N.	—	<i>Sharks</i> were seen in s.-ss. 31, 23, 12, 14, 03. In s.-s. 14 three dog-fish were caught.
2° to 3° N.	—	<i>Skipjacks</i> were seen in s.-s. 21.
" "	—	<i>Medusæ</i> " " 22.
3° to 4° N.	—	<i>Portuguese men-of-war</i> " 33.
		<i>Remarks.</i>
6° to 7° N.	64	Very many small <i>Squid</i> .
" "	68	Sea full of <i>Animalcules</i> .
		<i>Sea Birds.</i>
0° to 10° N.	—	<i>Stormy Petrels</i> were seen 11 times, abundant in s.-ss. 31 and 23.
0° to 9° N.	—	<i>Birds</i> (supposed to be sea birds) were seen six times; they were flying to the Wd. in s.-ss. 22 and 12.
8° to 9° N.	85	Large quantities of birds, commonly called Boatswains (<i>Phaëton</i>), flying to the E.N.E.
		NOTE.—The above data seem to show that all fish, &c., excepting Bonitos and Flying Fish were very much confined to the Sn. part of the square where the two Trades meet.

* A dot under a sub-square indicates that the creatures were abundant there, two dots very abundant, &c.

FALLING STARS.

There are seven entries of Falling Stars, distributed over five years between 1855 and 1871; of these, three were in 1860,* and in no other year more than one. The following remarks seem worthy of extraction:—

Sub-square.	Hour.	Day.	Year.	Remarks on Falling Stars.
15	8 p.m.	9th	1855	A few shooting stars from S.S.W. to E.S.E.
01	4 a.m.	2nd	1860	Stars shooting from N.E. to S.
84	8 p.m.	18th	"	Stars shooting to N.E.
81	5 a.m.	23rd	"	Three stars from S.E. to N.W.; one burst, and left behind a tail of fire.
22	8 p.m.	3rd	1867	Stars shooting from S.E.
85	4 a.m.	26th	1870	Several stars shooting from S.E. to N.W.
86	10 p.m.	24th	1871	A very brilliant meteor passed from the zenith towards the N.N.E., and a quantity of small ones passed the zenith towards the N.E., E., and S.E., during the night. None visible to the Wd.

TEMPERATURE OF RAIN AND AIR.

	Sub-square.	Temperature of Rain.	Temperature of Air.
	32	69°0	75°8
	33	70°6	77°1
	"	74°0	78°0
	34	76°0	79°0
	"	75°0	78°0
	21	73°7	77°3
	12	74°5	78°0
	15	73°2	74°8
	"	74°2	76°8
	"	74°8	77°5
	01	75°5	80°0
	Sum	11) 40°5	11) 82°3
	Mean	73°7	77°5 Difference 3°·8.

The mean temperature of rain is very nearly the same as in January, but that of the air is about 2° higher. All the above observations were taken between 0° and 4° N., whilst those of January were between 0° and 7° N.

* In Square 39 there were only six entries of falling stars in February, but they were all in 1860.

TEMPERATURES OF AIR ABOVE AND ON DECK.

Sub-square.	Hour.	50 feet above Sea.	On Deck.	Remarks.
70	?	76°0	75°7	Weather m. b. c.
50	?	79°0	78°5	„ c. b. m.
40	?	79°5	80°0	„ c. b.
30	?	74°5	79°0	„ o.
10	8 a.m.	77°0	78°0	
00	?	77°0	79°2	
	Sum	6)43°0	6)50°4	
	Mean	77°2	78°4	Difference 1°2.

These observations were all recorded by Captain Haines of the “British Empire,” between the 10th and 19th, in 1860.

VARIOUS.

Sub-square. 74 10th, 1856. We are surrounded with the red fog, all sails and ropes covered with it. The few clouds that are to be seen (cir.-c.) are directly overhead, moving slowly from S.E. I attempted to collect some of the dust, but have not succeeded. There has been no dew or dampness in the air, night or day, since the fog first came. (Steady brisk breeze from N. b. E.)

BEST ROUTES FOR CROSSING THE EQUATOR.

By comparing the mean forces of all winds in the Tables for February in Appendix B, it is shown that they are decidedly stronger on the Wn. than on the En. side of the Cape Verd Islands. Appendix B. also shows that in the Wn. half of the square S.Ely. winds are frequently experienced to the Nd. of those Islands. A similar prevalence of winds from the S.En. quarter (*i.e.* from E. to S. by E.) in the Wn. over the En. half of the Square, is also shown very decidedly in November and December; more especially in the Nn. part of the Square.

The following Table shows the three prevailing points in each quarter for each half of the Square, and will help the Navigator to shape his course. For instance, the N.Ely. wind of the Wn. half is more Ely. than that of the En. Again, the S.Ely. wind in both halves is generally from E., for that point is classed in the S.En. quarter, and rarely to the Sd. of E.S.E., so that it will allow the outward-bound ship to make a due south course.

TABLE 12.

The Direction of the three Prevailing Winds of each quarter of the compass, in each half of Square 39. They are in the order of their prevalence. A dash under a letter or figure indicates extreme prevalence.

Latitude.	N. to E. b. N., or N.Ely. Winds.		E. to S. b. E., or S.Ely. Winds.		S. to W. b. S., or S.Wly. Winds.		W. to N. b. W., or N.Wly. Winds.	
	Wn. half.	En. half.	Wn. half.	En. half.	Wn. half.	En. half.	Wn. half.	En. half.
	25° to 30° W.	20° to 25° W.	25° to 30° W.	20° to 25° W.	25° to 30° W.	20° to 25° W.	25° to 30° W.	20° to 25° W.
	Points from North.	Points from North.	Points from South.	Points from South.	Points from South.	Points from South.	Points from North.	Points from North.
18° to 20° N.	2, 6, 5	2, N., 4	8, 7, 5	8, — —	— — —	— — —	1, 4, 7	5, 4, 3
16° — 18° N.	4, 6, 5	2, N., 3	8, 7, 6	8, 5, 1	— — —	S., 1, 4	— — —	— — —
14° — 16° N.	4, 6, 5	2, 3, 1	8, 7, 4	8, — —	— — —	— — —	5, — —	— — —
12° — 14° N.	3, 5, 2	2, N., 3	8, 7, —	8, — —	— — —	— — —	— — —	1, — —
10° — 12° N.	3, 4, 2	1, 5, 3	7, 8, —	— — —	— — —	— — —	1, 2, 3	2, 3, 1

The accompanying Chart for February, and more especially the prevailing-wind-arrows on the Diagram in its lower right-hand corner show that from 2° to 10° N. the prevailing wind is Nly., and that it is much stronger and more Ely. on the Wn. than on the En. side of the square. Light N.Wly. winds are also very common on the En. side of Square 3. (Before consulting the Chart it may be well to read the last paragraph on p. 9, which precedes the Remarks for January.) The Chart and Diagram also show

that from the Equator to 2° N. the prevailing wind is S.Ely., being slightly stronger on the Wn. than on the En. side of the square. Westerly currents prevail throughout the square, being strongest between 0° and 2° N.; there is, however, a decided show of Ely. current on the En. side of the square between 4° and 8° N.

Appendix C will guide the Navigator in passing to the Sd. of Cape St. Roque. On drawing pencil lines through the largest per-centages of wind for each degree of latitude in each part of Square 303, that in the Wn. part is found to run irregularly until it passes to the Sd. of 4° S., but that in the En. is very steady down the S.E. by E. column. The mean direction of prevailing winds in the En. part is S.E. by E. $\frac{1}{4}$ E., whilst that in the Wn. is S.E. by E., a difference scarcely worth noticing. The mean force of the *prevailing* winds in the En. part is 3·8,* whilst in the Wn. it is 4·3. The mean of the mean forces of *all winds* in the En. part is also 3·8, whilst in the Wn. it is 4·2. Variables and calms are frequently experienced between 0° and 2° S.

The above facts show that the *Outward-bound* ship should pass to the Wd. of the Cape Verd Islands in February, as there are stronger winds on the Wn. sides of Squares 39 and 3, and although the Wly. current is pretty strong near the Equator, a true S.E. by E. wind, or one more favourable, may be expected after crossing it, for it will be seen that, on drawing a line through the prevailing winds down each Table in Appendix C, there will generally be found more winds to the left than to the right of those lines, *i.e.*, more to the Ed. than to the Sd. of the prevailing winds. It has already been shown that the winds near Cape St. Roque are stronger than they are further to the Ed., so that it seems right to conclude that a fair sailing ship may come to the Sd. in 26° W., taking the tack which gives the most Southing after getting a Sly. wind. The ship "Florence Nightingale," Captain James Gales, crossed the Equator about 8 A.M. of the 6th, 1857, in $29^{\circ} 48'$ W. At noon of the 7th she was in $2^{\circ} 24'$ S., $31^{\circ} 3'$ W.; on the 8th, $4^{\circ} 56'$ S., $32^{\circ} 40'$ W.; on the 9th, $7^{\circ} 28'$ S., $33^{\circ} 23'$ W.; on the 10th, $10^{\circ} 1'$ S., $34^{\circ} 5'$ W. The wind was S.Ely. and favourable, as shown by the amount of Southing made each day: the currents were Wly., but not strong.

The *Homeward-bound* ship should certainly cross the Equator to the Wd. of 25° W., for Table 2 and the published Chart (especially that part of it which lies between 2° and 4° N.) show that, besides experiencing much lighter winds, ships in the En. part of Square 3 meet with a large per-centage of N.Wly. winds, which are most trying to a homeward-bound ship, for they drive her to the N.Ed. into the very light Nly. winds which lie on the En. side of the square.

* See the lower part of the note to Beaufort's scale, on the upper right-hand corner of each chart, for the value of these forces in speed per hour of Beaufort's ship.

MARCH.

BAROMETER.—The red isobar (see the Diagram in the lower right-hand corner of the Chart) shows that the lowest pressure is in the S.Wn. corner of the square. The lowest mean pressure in the lateral strips (29·915) lies between 2° and 3° N., where there has been a decrease of ·019 of an inch since February. The highest mean pressure in the lateral strips (29·971) is between 9° and 10° N. where there has been an increase of ·007 of an inch since February. Between 7° and 10° N. there has been no change in the *mean* pressure since February, but from 0° to 7° N. the average decrease is ·015in.

The mean of the means in the lateral strips (29·934), indicates that the Mean Pressure of the square has decreased ·010in. since February. This is the lowest monthly mean during the prevalence of Nly. winds in the square. A comparison of the vertical strips shows that the pressure has decreased about ·004 more on the En. than on the Wn. side of the square since February; a similar comparison shows that the temperature of both air and sea has increased $0^{\circ} 4$ Fahr. more on the En. than on the Wn. side, indicating a close relation between changes of temperature and pressure. The slight differences in the changes of previous months also indicate that where there has been the greatest *decrease* of pressure there has also been the greatest *increase* of temperature.

The isobars show that the disposition of atmospheric pressure throughout the square is very similar to that for February; also that in the N.Wn. corner, where the wind is strongest, the isobars are closest.

Air Temperature.—The air isotherms show a general increase of temperature since February, though the change has been greater in the Sn. than in the Nn. half of the square. A comparison of the lateral strips for the two months shows that the greatest increase for both air and sea lies between 3° and 4° N., where it amounts to 1° Fahr. in both cases. It seems worthy of notice that the isotherms bend to the Sd. on the Wn. side of the square, where the N.Ely. wind is strong. The Mean Temperature of the whole square (79°) shows an increase of $0^{\circ} 6$ since February.

Dry and Damp Bulbs.—The least difference of dry and damp bulbs shown by the means in the lateral strips is $3^{\circ} 3$; it lies between 2° and 3° N., where there is the lowest pressure. The greatest difference ($4^{\circ} 3$) is between 7° and 8° N. The vertical strips have a much greater difference on the Wn. than on the En. side of the square; this is very well shown by comparing the En. and Wn. strips of the published Chart. The Mean Difference for the month ($3^{\circ} 8$) is the same as that for February.

Sea Temperature.—The isotherms of surface water are still very similar to those of the air. There is a patch of water at a temperature of 82° on the S.En. side of the square. The Mean Temperature for the whole square ($79^{\circ} 9$) shows an increase of $0^{\circ} 7$ since February; it is about $0^{\circ} 9$ higher than that of the air.

The coldest air and water are in the N.En. corner of the square; this is probably caused by the cold Sly. current experienced along the coast of Africa, which was alluded to when remarking on the changes in January.

Specific Gravity.—The lateral strips have the lowest specific gravity (1·0262) between 2° and 3° N., the highest (1·0270) between 7° and 8° N. and again between 9° and 10° N. The Mean for the square (1·0267) shows a decrease of ·0002 since February. The vertical strips show that the specific gravity is lower on the En. than on the Wn. side of the square. The published Chart shows more rain and less wind on its En. than on its Wn. side, which many partially account for this difference in the specific gravity of the surface water.

WIND.

TABLE 1.—LATERAL STRIPS.

Lateral Strips. 10° of Longitude by 1° of Latitude.	No. of Observa- tions.	Mean Force of Strip.	N. to E. by N. or N.Ely.		E. to S. by E. or S.Ely.		S. to W. by S. or S.Wly.		W. to N. by W. or N.Wly.		Variables.		Calms.	Prevailing Wind.		Strongest Wind.*	
			%	Mean Force.	%	Mean Force.	%	Mean Force.	%	Mean Force.	%	Mean Force.		No. of Observations. Direction.	Mean Force.	No. of Observations. Direction.	Mean Force.
9° to 10° N. -	174	4°0	92	4°1	2	3°9	—	—	5	3°3	1	3°8	—	N. ³³ by E.	4°0	E.N.E. ¹¹	5°1
8° - 9° N. -	187	3°8	89	3°9	2	3°8	—	—	5	2°4	3	3°2	1	N.E. ⁴⁷ by N.	4°2	N.E. ²¹	4°5
7° - 8° N. -	239	3°9	92	4°0	1	4°3	1	1°5	5	3°2	1	2°5	—	N.N.E. ⁵⁴	4°0	N.E. ⁵² by N.	4°4
6° - 7° N. -	289	3°7	88	3°8	3	3°3	—	—	7	2°9	1	2°3	1	N.N.E. ⁶³	4°0	N.E. ¹³ by E.	4°1
5° - 6° N. -	381	3°1	76	3°6	4	2°9	2	1°8	9	2°5	3	2°0	6	N.N.E. ⁷⁰	3°6	N. ⁴⁵ by E.	4°1
4° - 5° N. -	453	2°7	57	3°3	14	2°4	4	1°9	10	2°6	7	1°6	8	N. ⁶² by E.	3°5	N.E. ¹² by E.	3°7
3° - 4° N. -	559	2°4	50	3°0	18	2°6	4	2°3	9	2°2	8	1°5	11	N. ⁵⁷ by E.	3°0	N.N.E. ⁴³	3°3
2° - 3° N. -	536	2°2	38	2°7	26	2°7	6	2°3	7	1°9	10	1°8	13	N.N.E. ³⁷	2°5	N.E. ¹⁶ by E.	3°2
1° - 2° N. -	502	2°2	23	2°7	35	2°9	10	2°1	11	2°2	8	1°6	13	S.E. ³⁰ by S.	3°2	N.E. ¹⁶ by E.	3°3
0° - 1° N. -	441	2°4	20	2°4	53	2°8	9	1°9	4	2°2	6	2°3	8	S.E. ⁴⁵	2°8	S.E. ⁴¹ by S.	3°3

* In recording the Strongest Wind in a strip, weight has been given to the number of observations; otherwise the direction and force of a single squall would frequently appear in this column.

TABLE 2.—VERTICAL STRIPS.

Vertical Strips. 10° of Latitude by 1° of Longitude.	No. of Observa- tions.	Mean Force of Strip.	N. to E. by N. or N.Ely.		E. to S. by E. or S.Ely.		S. to W. by S. or S.Wly.		W. to N. by W. or N.Wly.		Variables.		Calms.	Prevailing Wind.		Strongest Wind.*	
			%	Mean Force.	%	Mean Force.	%	Mean Force.	%	Mean Force.	%	Mean Force.		No. of Observations. Direction.	Mean Force.	No. of Observations. Direction.	Mean Force.
20° to 21° W.	364	2·1	31	2·7	23	2·3	8	2·1	18	2·4	9	1·3	11	³¹ N.	3·0	³¹ N.	3·0
21° - 22° W.	482	2·1	36	2·7	25	2·5	8	2·1	12	2·4	5	1·7	14	³⁶ N.	2·7	E. by S. ¹⁰	3·4
22° - 23° W.	677	2·4	40	2·9	24	2·7	7	1·9	12	2·4	7	1·9	10	⁵¹ N.	2·5	N.E. by N. ⁴²	3·2
23° - 24° W.	545	2·6	51	3·1	24	2·9	5	2·2	4	2·5	7	1·5	9	⁶⁰ N.N.E.	3·2	N.E. by E. ²⁰	3·7
24° - 25° W.	399	3·0	68	3·4	14	2·9	1	2·5	6	2·7	7	1·7	4	⁵¹ N.	3·0	N.E. by E. ²⁶	4·0
25° - 26° W.	390	3·1	59	3·6	20	3·0	3	2·4	5	2·7	6	2·2	7	⁴² N.E. by N.	3·8	N.E. by N. ⁴²	3·8
26° - 27° W.	294	3·4	75	3·7	11	3·5	2	2·0	5	2·3	5	2·5	2	⁴⁵ N.E. by N.	3·9	E.N.E. ¹⁸	4·9
27° - 28° W.	225	3·8	77	4·1	18	3·2	1	2·0	1	2·0	—	—	3	⁵³ N.E. by N.	4·3	N.E. by N. ⁵³	4·3
28° - 29° W.	193	3·7	77	4·2	14	2·9	1	2·5	4	1·7	1	1·5	3	⁴⁰ N.E. by N.	4·3	N.N.E. ³⁰	4·7
29° - 30° W.	192	3·8	80	4·1	5	3·8	3	2·0	4	2·3	5	2·5	3	⁵¹ N.E. by N.	4·4	N.N.E. ³⁴	4·5

By comparing the means of the percentages in the lateral strips (Table 1) with those for February we get the following result for the whole square:—

N.Ely. wind 62% and decreased about 2% since February.
S.Ely. „ 16 „ and increased „ 3 „
S.Wly. „ 4 „ and no change „ „
N.Wly. „ 7 „ and decreased „ 3 „
Variables 5 „ and no change „ „
Calms 6 „ and increased about 2 „

The Mean Force for the whole square (3·0) shows a decided decrease in the mean force of all winds since February, amounting to about ½ a mile an hour in the speed of Beaufort's ship, but on analyzing the change it is found that in the Nn. part of the square, where the N.E. Trade prevails, the force of N.Ely. wind has decreased very decidedly, (between 9° and 10° N. the decrease amounts to nearly 2 miles an hour of Beaufort's ship,) whilst in the Sn. part of the square where the S.E. Trade prevails, the S.Ely. wind has slightly increased in force; the increase amounting to nearly a mile an hour of Beaufort's ship between 2° and 3° N.

A comparison of the isobars and prevailing winds of March with those of February (see the Diagrams in the lower right-hand corners of the Charts) shows that they are very similar for the two months, the N.E. wind still extending to 2° N. and being much more Ely. and stronger on the Wn. than on the En. side of the square.

Table 2, and the vertical strips on the published Chart show how both the N.Ely. and S.Ely. winds still increase in force, and the proportion of calm decreases, as you glance from the En. to the Wn. side of the square.

* In recording the Strongest Wind in a strip, weight has been given to the number of observations; otherwise the direction and force of a single squall would frequently appear in this column.

TABLE 3.

Latitude.	s.-s.	Winds, Force 7 or upwards, but not Squalls.	Direction of Squalls and Heavy Squalls. (All Squalls Force 7 or upwards are considered to be heavy.) (All Squalls on either side of N., S., E., or W., are given to their re- spective quarters, so that there are fewer from the above-named points than from the quarters.)								s.-s.	REMARKS. NOTE.—A bar, thus —, separates the Remarks of different Logs. The dates of Trade limits are in the order of the sub-squares in which they occurred, beginning with the most Eastern one.
			N.	N.E.	E.	S.E.	S.	S.W.	W.	N.W.		
			Heavy.	Heavy.	Heavy.	Heavy.	Heavy.	Heavy.	Heavy.	Heavy.		
9° to 10° N.	96	E.N.E. 7 2 entries.	—	—	—	—	—	—	—	—	—	—
8° — 9° N.	84	N.E. 7	—	—	—	—	—	—	—	—	86	Trade gusty. Wind rather fitful.
7° — 8° N.	86	E.N.E. 7	—	—	—	—	—	—	—	—	89	Light variable Trade.
	76	E.N.E. 7	—	—	—	—	—	—	—	—	74	Very gusty.
	78	N.E. 7 to 8	—	—	—	—	—	—	—	—	77	Unsteady Trade.
	"	N.E.b.N. 7 2 entries.	—	—	—	—	—	—	—	—	79	Puffy.
6° — 7° N.	66	E.N.E. 7 2 entries.	—	3	—	—	—	—	—	—	60 & 63	Sn. limit of N.E. Trade, 26th, 20th, 20th.
5° — 6° N.	67	N.N.E. 7	—	—	—	—	—	—	—	—	60	Steady N.W. wind.
	68	N.N.E. 7	—	—	—	—	—	—	—	—	52 to 56	Sn. limit of N.E. Trade, 24th, 7th, 26th, 30th, 20th, 15th.
	56	N. b. E. 7	—	—	1	—	—	1	—	—	44	Sn. limit of N.E. Trade, 19th.
	57	" 7	—	—	—	—	—	—	—	—	40	Heavy E.S.E. squall, furious for an hour and a half; wind previously Nly.
4° — 5° N.	49	N. b. E. 7	—	1	1	—	1	—	—	—	45	Tremendously dark night, wind round the compass 3 or 4 times each watch.
3° — 4° N.	—	—	—	—	3	—	—	—	1	—	33 to 39	Sn. limit of N.E. Trade, 28th, 29th, 23rd, 18th.
	—	—	—	—	—	—	—	—	—	—	33 & 35	Nn. limit of S.E. Trade, 26th, 25th.
	—	—	—	—	—	—	—	—	—	—	33	Gusty.
	—	—	—	—	—	—	—	—	—	—	34	18th, 1871. This is the 7th day we have been between 3° and 4° N. (ship bound N., wind N. 2.).
2° — 3° N.	—	—	—	4	2	1	1	2	1	—	21 to 25	Sn. limit of N.E. Trade, 8th, 24th, 7th, 18th.
1° — 2° N.	—	—	—	—	—	—	—	—	—	—	20 to 24	Nn. limit of S.E. Trade, 19th, 22nd, 28th, 8th, 13th.
	—	—	—	—	—	—	—	—	—	—	21	Low moaning noise with the wind.
	—	—	—	—	—	—	—	—	—	—	24	Hard squall for about a minute, a barque close to us did not seem to get any of it.
	—	—	—	—	—	—	—	—	—	—	26	Squalls from S. b. E. to N.W. b. W., force 7, with t. l. and exceedingly heavy rain.
1° — 2° N.	—	—	—	—	—	—	—	—	—	—	"	Squalls from N. b. E. to N.W., force 8, with r.
	—	—	—	—	—	—	—	—	—	—	12 to 18	Sn. limit of N.E. Trade, 23rd, 12th, 25th, 12th.
	—	—	—	—	—	—	—	—	—	—	11 to 17	Nn. limit of S.E. Trade, 1st, 10th, 6th, 17th, 8th, 15th, 7th.
	—	—	—	—	—	—	—	—	—	—	11	Black clouds all round horizon.—Low moaning noise with the wind.
0° — 1° N.	—	—	—	—	—	—	—	—	—	—	12	Wind changes in squalls from W.S.W. to W.N.W., force 1 to 6.
	—	—	—	—	—	—	—	—	—	—	15	A severe squall from N. b. E.
	—	—	—	—	—	—	—	—	—	—	16	Sudden shift from N.E. to S.E., with heavy squall and rain.
	—	—	—	—	—	—	—	—	—	—	05	Nn. limit of S.E. Trade on 30th.
0° — 1° N.	—	15, all N.Ely.	—	10	8	2	2	5	5	1	—	—

NOTE.—14 of the 15 strong N.Ely. winds were on the Wn. side of the square.
7 of the 8 heavy N.Ely. squalls were on the En. "
The 2 heavy Ely. " "
3 of the 5 heavy S.Ely. " "
The heavy S.Wly. squall was " "

Table 10, which is deduced from the data in the weather columns of logs agrees with Table 3 in showing a larger percentage of squalls on the En. than on the Wn. side of the square. There were 11 heavy squalls on the En. and only 6 on the Wn. side of the square, but the relative value of these figures is modified by the fact that more observations of all kinds were taken on its En. than on its Wn. side.

Table 3 agrees with that for February in showing that all Strong Winds, which were not squalls, were N.Ely., and that nearly all were on the Wn. side of the square; but it differs remarkably in the fact that nearly all the heavy Squalls were on its En. side. These facts are clearly shown by the note which follows the Table.

CURRENTS.

TABLE 4.

LATERAL STRIPS.

Lateral Strips. 10° of Longitude by 1° of Latitude.	No. of Observa- tions.	Mean Rate.	N. to E. by N. or N.Ely.		E. to S. by E. or S.Ely.		S. to W. by S. or S.Wly.		W. to N. by W. or N.Wly.		None.	Prevailing Current.		Strongest Current.*	
			%	Mean Rate.	%	Mean Rate.	%	Mean Rate.	%	Mean Rate.		No. of Observations.	Mean Rate.	Direction.	Rate.
9° to 10° N.	33	9	12	11	9	16	37	15	9	14	33	S.	11	W. by S.	37
8° — 9° N.	32	12	6	10	19	13	31	19	25	11	19	S.	16	W. by S.	41
7° — 8° N.	50	9	6	11	24	15	26	12	16	11	28	S. by E.	19	S. by E.	24
6° — 7° N.	49	9	6	12	10	14	29	16	16	16	39	S.	18	N.W.	34
5° — 6° N.	70	11	4	8	24	14	26	17	26	13	20	W.	12	S. by W.	30
4° — 5° N.	65	12	11	11	37	16	25	15	6	16	21	E.	20	S.S.E.	33
3° — 4° N.	62	12	11	13	24	16	20	14	24	15	21	E.	13	W. by S.	41
2° — 3° N.	56	17	4	32	13	19	14	16	57	20	12	W.	18	E.N.E.	42
1° — 2° N.	54	19	2	20	7	14	15	21	57	25	19	W. by N.	27	N.W.	51
0° — 1° N.	65	14	6	17	2	6	25	18	49	18	18	W.	17	W.	53

* The strongest Current in each Strip is here given, as it is important to the Navigator to know the extreme to which he is liable.

TABLE 5.

VERTICAL STRIPS.

Vertical Strips. 10° of Latitude by 1° of Longitude.	No. of Observations.	Mean Rate.	N. to E. by N. or N.Ely.		E. to S. by E. or S.Ely.		S. to W. by S. or S.Wly.		W. to N. by W. or N.Wly.		None.	Prevailing Current.		Strongest Current.*	
			%	Mean Rate.	%	Mean Rate.	%	Mean Rate.	%	Mean Rate.		No. of Observations. Direction.	Mean Rate.	Direction.	Rate.
20° to 21° W.	55	12	7	16	31	15	13	11	27	18	22	W.	20	W.N.W.	36
21° - 22° W.	53	15	9	16	17	20	19	15	32	22	23	W.	23	W.	49
22° - 23° W.	74	13	11	15	19	15	19	15	30	18	21	W. by N.	17	W.N.W.	45
23° - 24° W.	89	13	7	10	18	14	21	18	31	20	23	N.W.	25	W.	53
24° - 25° W.	61	11	5	13	20	14	26	14	26	15	23	W.	16	W.N.W.	28
25° - 26° W.	56	12	5	12	20	14	30	16	25	15	20	W. by S.	26	W. by N.	42
26° - 27° W.	46	12	11	11	11	15	33	14	26	17	19	W.	15	W.N.W.	33
27° - 28° W.	35	14	3	13	6	10	37	16	31	23	23	W. by S.	21	W.N.W.	51
28° - 29° W.	38	12	3	10	18	14	16	18	39	17	24	W.	15	W. by S.	37
29° - 30° W.	29	12	—	—	3	32	35	20	31	14	31	W.	15	S.W. by S.	32

Table 4 shows that N.Wly. currents prevail both in percentage and speed from the Equator to 3° N.; between 1° and 2° N. their mean speed is 25 miles in 24 hours.

Between 4° and 5° N. S.Ely. currents prevail; this fact is borne out by the Remarks, where only Ely. currents are mentioned between 4° and 5° N.

Between 5° and 10° N. S.Wly. currents prevail in both percentage and speed. In the Northern half of the square there is a large amount of current setting nearly due South. (See the Chart, and the Prevailing Current in Table 4.)

Table 5, the En. strips of the Chart, and the Diagram, all show that there are more and stronger Ely. currents on the En. than on the Wn. side of the square. Table 2 shows that there is also much more N.Wly. wind on its En. side. Perhaps the N.Wly. winds and S.Ely. currents may be related.

Remarks on current rippings are most numerous between 3° and 4° N., where the Ely. and Wly. currents meet, though they are very general throughout the square.

* The strongest Current in each Strip is here given, as it is important to the Navigator to know the extreme to which he is liable.

The following remarks have been extracted:—

Latitude.	Sub-square.	Remarks from Logs.	
		NOTE. A bar, thus —, separates the remarks from different Logs.	
9° to 10° N.	90	Heavy tide rips making much noise.	
	91	Sea looking quite disturbed, as if a three or four knot tide were running.—Strong current rips about every quarter of an hour.	
8° - 9° N.	80	Tide rips very frequent at intervals; in passing through them there is always a sensible increase of breeze, and I think the phenomenon is caused by some disturbing influence of the air.	
	70	Strong tide rips from S.W. and N.N.W.—Strong current ripples, but no current felt.	
7° - 8° N.	72	Several strong ripples coming from the Wd. and meeting the swell (from Nd.), causing much noise, and travelling very fast; they gave me the idea of a shoal of mackerel, but they were not caused by fish.	
	77	Frequent strong ripples throughout the day, in broad bands, trending from E. b. S. to W. b. N., with alternate calm spaces. During the ripples the sea curled and topped alongside as if we were going eight or nine knots; there was no difference of temperature in the rips: the wind was N.N.E.	
5° - 6° N.	50	Current ripples all day, but the difference between observation and dead reckoning showed no current.	
	52	The water at times is just as if it were boiling.	
4° - 5° N.	40	Current rips at intervals of about a quarter of an hour, lasting three or four minutes.	
	31	Strong current rips setting to the Sd.; no wind.*	
3° - 4° N.	32	Regular continued series of tide rips (parallel) and "smooths," the latter being about seven times the breadth of the former, and extending W. b. S. and E. b. N., moving (if at all) to the Sd., wind N.E. 4.—Strong tide rips, setting to the Sd.; others to S.S.W.	
	34	Slight rips, but when calm, "oily tracks," and very smooth.	
2° - 3° N.	26	The water hissing and boiling, making a tremendous uproar all round.	
	11	Tide rips, roaring very much.	
1° - 2° N.	13	A tide ripple passed from N.W. b. W. to S.E. b. E., wind S.S.W.	
	15	Passed a patch of rippled water, perhaps half a cable's length in width.—Some "oil lanes."	
0° - 1° N.	00	Tide rips roaring very heavily. Constantly passing through narrow belts of strong tide rips running E. and W.; no alteration of temperature or specific gravity; wind variable.	
	08	I could plainly observe what I imagine was the Sn. border of the current, and, I hope, the last of it; we have been set 98 miles to N.Wd. in three days. (Ship going southerly.)	

SEA.

The sea was "very luminous" eight times between 1° and 10° N. Between 1° and 3° N. it was "extremely luminous" twice.

* No wind, means that it was calm at the time.

There are 12 entries of the sea being "deep blue," chiefly in 9° to 10° N., and 3° to 4° N.

There are 4 entries of a "green sea;" twice between 5° and 7° N., and twice between 0° and 2° N.; in s.-s. 06 it was "very green."

Latitude.	Sub-square.	Remarks from Logs. NOTE. A bar, thus —, separates the remarks from different Logs.
9° to 10° N.	90	4 a.m. 25th, Wind N. by E. 5. Sea temperatures: surface 73°, 19 feet below 71°.— Sea has quite a strong smell.
	97	10 a.m., 20th. A sudden rise of 4° in the surface temperature of the sea, without any apparent cause. I have noticed a similar rapid rise on my last two outward-bound voyages from between 12° and 9° N. (The temperature was 78° at noon of the 20th.)
		NOTE.—The following temperatures below the surface, in s.-ss. 88, 44, 32, and 22, were taken by the same ship in the same year; the method followed was to sink to the required depth a bamboo joint, with a valve at each end opening upwards; it was run up quickly, and the temperature of the water taken after it was brought on deck.
8° - 9° N.	88	Noon, 20th, Wind N.N.E. 3 to 4. Surface - 78° 1 fathom below, 78°
4° - 5° N.	44	Noon, 18th, Wind N.N.E. 4 to 5. Surface - 81°·5 1 fathom below, 81°·7
3° - 4° N.	32	10.30 to 11.30 a.m., 16th. Surface - 82°·5 1 fathom below, 82°·0 2 fathoms " 81°·6 3 " " 81°·8 4 " " 81°·6 5 " " 81°·6 6 " " 81°·5 7 " " 81°·5 8 " " 81°·8 9 " " 81°·7 10 " " 81°·7 11 " " 81°·8 12 " " 81°·6 13 " " 81°·5 14 " " 81°·5 15 " " 81°·5 16 " " 81°·5 17 " " 81°·5 18 " " 81°·4 19 " " 81°·4 20 " " 81°·2
	32	The specific gravity has decreased ·0009 in 24 hours (ship going Sly. from 4° 42' N. to 3° 11' N.)
	35	A large patch of water full of phosphorus passed about 100 yards off, and went very fast to the N.Ed. I suppose it was a whale swimming very close to the surface of the water.
2° - 3° N.	21	Surface of the sea like one mass of fire.
	22	Sea much warmer, and very confused: two currents of water, as well as of air, seem to be fighting for the mastery. (Ship from the Sd.) 0.30 p.m., 15th, a light Nly. air blowing; Surface - 81°·8 5 fathoms, 81°·4 10 " 81°·2 15 " 81°·0 20 " 81°·4

Latitude.	Sub-square.	Remarks on Sea. NOTE. A bar, thus —, separates the Remarks from different Logs.
2° to 3° N.	22	These observations were taken during a glassy calm, between 2.30 and 3 p.m. of the 15th, 1861. The uniform temperature between 5 fathoms and 30 fathoms, compared with the sudden fall of 10°·4 between 30 and 45 fathoms seems worthy of remark. The exact position was 2° 54' N. 22° 59' W.
		Sea temperature. Surface - 82°·2 5 fathoms, 81°·2 10 " 81°·3 15 " 81°·3 20 " 81°·3 25 " 81°·3 30 " 81°·3 45 " 70°·9 60 " 69°·8
1° - 2° N.	28	Sea luminous in large patches.
	15	Sea as it were on fire: darkness excessive.

Although S.Ely. winds prevail from 0° to 2° N., the Nly. swell has still the largest percentage there, showing how it extends beyond the wind causing it. It will also be seen that there is more Sly. than Nly. swell between 6° and 8° N. on the En. side of the square, where there are scarcely any Sly. winds; it must, however, be borne in mind that seamen are more inclined to note swells which are not produced by the existing wind, than those which are.

CLOUDS.

Tables 6, 7, and 8, with the Remarks on Clouds, are compiled from the data for 1° sub-squares.

TABLE 6.—LATERAL STRIPS.

PERCENTAGES OF EACH FORM, and MEAN AMOUNT of all CLOUDS.

Lateral Strips. 10° of Longitude by 1° of Latitude.	No. of Observations.	Upper Clouds.			Lower Clouds.				Amount, 10 being "Com- pletely Clouded."	
		Cir.	Cir.-c.	Cir.-s.	Cum.	Cum.-s.	Str.	Nim.	No. of Obs.	Mean.
		%	%	%	%	%	%	%		
9° to 10° N. -	100	19	15	9	48	6	16	3	119	4·2
8° - 9° N. -	114	24	22	4	46	14	7	1	141	4·2
7° - 8° N. -	135	19	19	9	49	9	14	2	177	4·3
6° - 7° N. -	187	13	19	9	55	12	9	10	235	5·3
5° - 6° N. -	235	11	17	8	46	16	13	17	302	5·7
4° - 5° N. -	290	13	14	6	41	17	10	30	351	6·2
3° - 4° N. -	373	10	13	8	39	17	12	34	396	6·4
2° - 3° N. -	353	7	11	5	39	17	14	38	407	6·7
1° - 2° N. -	323	8	15	8	41	17	13	26	375	6·2
0° - 1° N. -	274	12	15	8	48	15	7	21	348	5·1

TABLE 7.—VERTICAL STRIPS.
PERCENTAGES of EACH FORM, and MEAN AMOUNT of all CLOUDS.

Vertical Strips. 10° of Latitude by 1° of Longitude.	No. of Observa- tions.	Upper Clouds.			Lower Clouds.				Amount, 10 being "Com- pletely Clouded."	
		Cir.	Cir.-c.	Cir.-s.	Cum.	Cum.-s.	Str.	Nim.	No. of Obs.	Mean.
		%	%	%	%	%	%	%		
20° to 21° W.-	239	12	15	7	46	11	24	23	272	4.9
21° - 22° W.-	286	8	11	5	45	16	13	30	338	5.8
22° - 23° W.-	430	9	11	7	47	16	9	36	491	6.1
23° - 24° W.-	370	11	10	10	43	20	11	27	443	5.8
24° - 25° W.-	256	15	20	6	45	16	11	17	292	5.4
25° - 26° W.-	257	14	12	7	46	13	7	17	328	6.0
26° - 27° W.-	153	17	22	6	41	11	8	16	216	6.2
27° - 28° W.-	141	19	21	8	34	18	11	9	185	5.3
28° - 29° W.-	123	15	25	8	38	11	11	9	137	5.4
29° - 30° W.-	129	5	25	8	38	13	11	16	149	5.8

By taking the mean of the 10 strips in Table 6 it is shown that the Mean Amount of Cloud (5.4) has slightly decreased since February, but a comparison of the Amount in various strips shows that though it has decreased in the Nn. and Sn. parts of the square it has decidedly increased between 4° and 7° N., where it had decreased in February. We also find a similar tendency in the amount of Nimbus, for it has increased 11 % between 4° and 6° N. A comparison of Table 1 with that for February, shows that there has been a great decrease in the mean force of wind in the same zone.

Table 7, when compared with that for February, shows that the Mean Amount of Cloud has decidedly increased between 22° and 24° W., and that the percentage of Nim. has increased between 21° and 25° W., but especially between 22° and 24° W. where the increase amounts to 9 %. Table 7 also shows that both the percentage of Nim. and Amount of Cloud have very decidedly decreased between 27° and 30° W. Nim. and Cum.-s. are still much more prevalent on the En. than on the Wn. side of the square; between 22° and 23° W. the Nim. amounts to 36 %, whilst between 27° and 29° W. it only amounts to 9 %.

TABLE 8.
The following table is derived from the Remarks on Clouds in March :—

NOTE.—All cloud entries from N. to E. b. N. inclusive have been given to the N.En. quarter.
" " E. b. S. to S. " S.En. "
" " S. b. W. to W. b. S. " S.Wn. "
" " W. b. N. to N. b. W. " N.Wn. "

Upper clouds from E. or W. have been extracted in the remarks. Lower clouds flying with the wind have not been recorded.

Quarters from which the Clouds and Wind came.		Lower Clouds.			Clouds (doubtful whether upper or lower.)			Upper Clouds.		
Clouds from.	Wind from.	Total No. of Observa- tions.	No. in Nn. Half of Square.	No. in Sn. Half of Square.	Total No. of Observa- tions.	No. in Nn. Half of Square.	No. in Sn. Half of Square.	Total No. of Observa- tions.	No. in Nn. Half of Square.	No. in Sn. Half of Square.
N.En.	N.En.	—	—	—	1	—	1	29	16	13
"	S.En.	—	—	—	11	—	11	17	—	17
"	S.Wn.	—	—	—	1	—	1	2	—	2
"	N.Wn.	—	—	—	2	—	2	4	—	4
"	N.	—	—	—	1	—	1	1	—	1
"	S.	—	—	—	3	1	2	2	—	2
"	E.	—	—	—	—	—	—	6	—	6
"	W.	—	—	—	3	—	3	—	—	—
		—	—	—	22	1	21	61	16	45
S.En.	N.En.	—	—	—	35	14	21	38	13	25
"	S.En.	—	—	—	1	—	1	19	—	19
"	S.Wn.	—	—	—	2	2	—	3	1	2
"	N.Wn.	—	—	—	4	3	1	6	2	4
"	N.	—	—	—	3	2	1	5	1	4
"	S.	—	—	—	—	—	—	3	—	3
"	E.	—	—	—	2	1	1	—	—	—
"	W.	—	—	—	—	—	—	1	—	1
		—	—	—	47	22	25	75	17	58
S.Wn.	N.En.	—	—	—	5	4	1	27	24	3
"	S.En.	—	—	—	1	—	1	3	—	3
"	S.Wn.	—	—	—	—	—	—	1	—	1
"	N.Wn.	—	—	—	3	3	—	1	1	—
"	N.	—	—	—	2	1	1	2	2	—
"	W.	—	—	—	—	—	—	1	—	1
		—	—	—	11	8	3	35	27	8
N.Wn.	N.En.	—	—	—	2	—	2	9	7	2
"	S.En.	—	—	—	1	—	1	—	—	—
"	S.Wn.	—	—	—	1	—	1	—	—	—
"	N.Wn.	—	—	—	—	—	—	3	3	—
"	S.	—	—	—	2	—	2	—	—	—
		—	—	—	6	—	6	12	10	2

NOTE.—The following are the percentages of upper clouds from the various quarters, 183 being the total number of observations.
From the N.En. quarter 33 % being + 10 % since February.
S.En. " 41 " + 1 "
" S.Wn. " 19 " - 14 "
" N.Wn. " 7 " + 3 "

The number of observations on the motion of upper clouds has increased in both the Nn. and Sn. halves of the square, but most in the Sn.
In the Nn. half of the square the largest number of upper clouds was coming from the S.Wd. when the wind was N.Ely.
In the Sn. half of the square the largest number of upper clouds was coming from the S.Ed. when the wind was also N.Ely.

Table 8 and its note need no explanation. Of the 38 entries of upper clouds from the S.Ed. when the wind was N.Ely. 30 were between 1° and 6° N., whilst only 8 were between 6° and 8° N. Again, nearly all the upper clouds from the S.Wd. were seen in the Nn. half of the square. These facts agree with what has been remarked in February as to the motion of upper clouds being more from the S.Ed. in the Sn., and from the S.Wd. in the Nn. half of the square.

The following remarks on Clouds seem worthy of extraction:—

Latitude.	Sub-square.	Remarks on Clouds. NOTE. A bar, thus —, separates the Remarks from different Logs.
9° to 10° N.	92	Clouds more from the Ed. than the wind, and arching, with a fringe of light cum. at times; wind N. b. E.
	95	Cir.-c. from S.W. b. S., S. b. E., and S.E. b. E.; wind N. b. E.—Lower clouds from E. b. N., wind N. b. E.
8° - 9° N.	87	Upper clouds passing rapidly over the moon from S.E., wind N.E. b. N.
	89	Clouds from W., wind N.E.
7° - 8° N.	73	8 p.m. 5th, 1859. Several streaks of cirrus to the Nd., very bright, and shooting up like aurora; there were several meteors falling to the N.Ed., and others to the S.Wd. at the same time.
	76	The current of air forming the lower wind does not appear to be very elevated, as cir.-s. in sheets, similar to the external view of a quarter of an orange in shape, pass over from S.E. b. S. to N.W. b. N. with slow but steady motion, and apparently but little above the scud; wind N.N.E. 4.
	78	Clouds from W., wind N.Ely.
	79	Str. from W. b. S., wind N.N.E.—Clouds from W., wind N.Ely. (two entries.)
6° - 7° N.	67	Clouds from W., wind N.N.E.
5° - 6° N.	50	Clouds with considerable way from S.Ed.; wind N.W., 1 to 2.
	51	Clouds from S.E. b. S., no wind.*
	52	Clouds making up in S.E. b. S. and rising fast, N.E. trade still blowing.
	53	Clouds from S.E. b. S., no wind.—Nim. flying in and from all directions like a whirlwind.—Cum.-s. from S. b. E., wind N.Ely.
	54	Clouds (not very high) coming up from S.S.E., wind N.N.E.
	56	Cir.-c. from S.S.W., no wind.
	57	Clouds from N.E. b. N., no wind.—Upper clouds from Wd., wind N. b. E.
	58	Upper clouds passing rapidly over the moon from S.E. b. E., lower still more rapidly from N.E. b. N.; wind N.E. b. N. 5.
		22nd., 1870. From 6.30 to 7 p.m., wind N. b. E. 6, ship going S.S.W. A curiously shaped cloud appeared in the S.S.E., first appearing distinct at about 25° from the horizon, whence it moved steadily forward, or rather upward, to about 80°, when it settled down bodily to the N.Ed. It was shaped like a wheel with not quite half of its nave and spokes broken away from one side, diameter of wheel 11°, of nave 2½°. The middle spoke of the five remaining was horizontal, and seemed to extend from the centre of the nave to a distance of about 6° beyond the circumference; it terminated in a hook having its curve downwards. The weather was fine, and the atmosphere remarkably clear, with the usual Trade sky. The cloud was of a light grey colour, and though distinctly defined in shape, the patches of cir.-c. at the back could be clearly seen through. It was very much lower than the other clouds. Its shape was best defined when about 55° or 60° high. The wind being N. b. E. it came up obliquely against the wind, and finally settled down right in the wind's eye. Lost sight of it through darkness when it was about 30° high, at about 7.20 p.m. The men forward saw it about 10 minutes before the Captain, and went aft to tell him of it. Its general appearance was similar to that of a halo round the sun or moon.
	59	Upper sky so dense that it might be called cum., and moving quicker than the lower, or Trade wind sky; wind N.E. 4.†

* No wind, means that it was calm.

† The direction from which the upper clouds were coming was not recorded with this remark, but four hours previous there was "Cir.-c. from E.S.E.; wind N.E. 3."

Latitude.	Sub-square.	Remarks on Clouds. NOTE. A bar, thus —, separates the Remarks from different Logs.
4° to 5° N.	40	Clouds from S.E., no wind.*
	41	The peculiar way in which a line of cloud hung all yesterday in the N.E. (in s.-s. 40), extending from S.E. to N.W., with a calm and low barometer on the Sn. side of it, and the N.E. trade and higher bar. on its Nn. side looks as if this line marked the spot of an ascending current of air, and as if the clouds were formed by moisture condensing from the air as it rose.
	42	Clouds from S.W. b. S. and S.E. b. E., wind N.E. b. E.—The different strata moving from all points of the compass, but chiefly from N.N.W. and S.S.W., the latter being the upper stratum; wind N.N.W.
	44	Clouds changing form and character rapidly.
	46	Mottled cir. moving very slowly from E.N.E., wind N.N.E. (two entries.)
3° - 4° N.	30	Upper clouds from N.W., no wind.
	32	Upper clouds from S.W. b. S., lower fast from S.E. b. S. (wind doubtful). High and towering cum. rising in the S.W. and E.
	33	Upper clouds from S. b. W. and S.E. b. E., wind N. b. E.—During the night a bank of clouds constantly rising in the S. to an altitude of 25°, and settling down again.
	34	Noon. Black, wet-looking clouds to Nd. and Ed., large towering white clouds rising in S.E.—Clouds moving in all directions.—Cum. round horizon much broken with eyes and holes.—Clouds moving slowly from all directions, wind variable.—Cir. from E. feathery and scattered, wind N. b. W.
	35	Very heavy nim. from N.W. to N.E., bringing very little wind with it.—Feathery cirrus with stems to the N.Ed., wind N.Wly.
	38	Cir. from S.W. b. S., wind variable.
2° - 3° N.	21	Cir. from N. b. W., no wind.—Clouds slowly from E.S.E. and N.N.E., fast from W.N.W., wind S.S.E.
	22	Upper clouds from E. b. N., lower from S. b. E., wind E.S.E.
	24	Clouds moving slowly over the moon from various directions, no wind.—Feathery cir. with stems to the N.Ed., wind N.
	27	Clouds from the S.Wd., no wind.
	29	Upper clouds from E., wind N. (two entries).
1° - 2° N.	11	Clouds from N.N.E., no wind (three entries).
	12	Cir. from E. b. N., lower clouds from S.W. b. S., wind S.S.E.—Cir. from E., wind S.S.E.—Clouds from S.E. b. E., no wind.
	13	Clouds from S. b. E., wind E.S.E.
	14	Innumerable small cum. of fantastic shape resting on a base of some altitude.
	15	Clouds from S. b. E., no wind (two entries).—Cum. in large masses, square blocks and columns of cloud with straight bases.
	18	Cir.-c. from E., wind N.W. Upper from E., wind Nly. (two entries). Heavy cum. to the Ed. going fast over the moon from S.S.E., overhead and to the westward from N.; light Nly. airs at times, but generally calm.
0° - 1° N.	00	Clouds from Ed., wind S.S.E. (two entries).
	01	Cir.-c. fast from E., wind E.S.E. 5.—Cir.-c. from E. b. N., no wind.
	02	Cir. from S.E. b. S., lower clouds from S. b. W., wind S.E.—Clouds from Ed., wind S.E. (two entries).
	05	Cir.-c. from S.E. b. E., nim. from S. by. W., wind S.E. b. E.

* No wind, means that it was calm at the time.

WEATHER.

TABLE 9.—LATERAL STRIPS.

Lateral Strips, being 10° of Longitude by 1° of Latitude.	Thunder. (t.) %	Lightning. (l.) %	Squalls. (q.) %	Rain. (r.) %	Mist or Haze. (m.) %	Dew. (w.) %
9° to 10° N.	—	—	—	—	29	6
8° — 9° N.	—	2	$\frac{1}{2}$	—	29	4
7° — 8° N.	—	1	$\frac{3}{4}$	—	29	3
6° — 7° N.	2	6	4	1	30	2
5° — 6° N.	4	9	7	8	18	1
4° — 5° N.	5	11	8	16	14	1
3° — 4° N.	10	16	11	19	6	$\frac{1}{2}$
2° — 3° N.	8	13	12	26	5	$\frac{1}{3}$
1° — 2° N.	5	13	11	18	3	$\frac{2}{3}$
0° — 1° N.	2	12	7	12	5	1

TABLE 10.—VERTICAL STRIPS.

Vertical Strips, being 10° of Latitude by 1° of Longitude.	Thunder. (t.) %	Lightning. (l.) %	Squalls. (q.) %	Rain. (r.) %	Mist or Haze. (m.) %	Dew. (w.) %
20° to 21° W.	5	14	9	10	12	1
21° — 22° W.	5	11	9	14	8	1
22° — 23° W.	7	11	7	20	8	1
23° — 24° W.	7	14	8	15	11	$\frac{3}{4}$
24° — 25° W.	4	12	8	12	26	$\frac{1}{2}$
25° — 26° W.	3	7	9	11	18	1
26° — 27° W.	3	7	7	13	13	1
27° — 28° W.	2	5	8	7	17	4
28° — 29° W.	3	7	4	7	12	4
29° — 30° W.	$\frac{1}{2}$	5	4	8	14	1

TABLE 11.—LIGHTNING.

This Table gives the bearing on which Lightning was seen in the various Lateral Strips. Only the bearings recorded as actually N., S., E., or W. have been given to those points.

Lateral Strips, being 10° of Longitude by 1° of Latitude.	Number of Observations.	N.	N.Ely.	E.	S.Ely.	S.	S.Wly.	W.	N.Wly.	All round	No direction given.
9° to 10° N.	—	—	—	—	—	—	—	—	—	—	—
8° — 9° N.	2	—	—	—	1	1	—	—	—	—	—
7° — 8° N.	2	—	—	1	1	—	—	—	—	—	—
6° — 7° N.	6	1	1	1	—	—	2	—	—	1	—
5° — 6° N.	10	—	1	2	3	1	2	—	1	—	—
4° — 5° N.	20	1	4	3	3	—	2	1	2	2	2
3° — 4° N.	27	3	9	1	2	3	—	1	2	2	4
2° — 3° N.	25	2	8	3	2	2	—	1	2	2	3
1° — 2° N.	29	2	10	3	4	2	1	2	2	2	1
0° — 1° N.	26	4	6	2	4	3	—	—	3	2	2
Total for month and how distributed -	147	13	39	16	20	12	7	5	12	11	12

Table 9, like that of the preceding months, gives the percentages of certain exceptional weather; by meaning these percentages and comparing their means with those for February, it is shown that all have increased, excepting rain and mist, which have decreased.

The percentages of thunder, lightning, and squalls have increased most between 5° and 6° N., in which zone rain has also very much increased, though its average for the whole square is less than in February. The greatest decrease of mist or haze has also taken place between 5° and 6° N. Between 6° and 8° N., the Nn. verge of unsettled weather where there is scarcely any rain, mist has very decidedly increased, though the average percentage is lower than in February. The Chart shows that between 6° and 10° N. there is much more mist on the En. than on the Wn. side of the square, which seems to indicate its African origin. Further South, where there is more rain on the En. than on the Wn. side of the square, there is less mist, indicating how the rain washes the air.

Between 8° and 10° N. there has been a great increase of dew since February, and Table 10 shows that it was chiefly on the Wn. side of the square. Table 10 and the published Chart also show that there are still much more thunder, lightning, and rain, as well as rather more squalls, on the En. than on the Wn. side of the square. All heavy squalls were between the Equator and 6° N., on an average one in every 16 was heavy. The two very heavy squalls recorded in March were experienced in s.-ss. 40 and 15; the remarks on them are given in Table 3.

Table 11 shows that lightning was most frequently seen on some Sly. bearing between 5° and 9° N., and on some Nly. bearing between 0° and 5° N. It has been shown above that the greatest increase of unsettled weather, since February, took place between 5° and 6° N., where this change in the direction of lightning was experienced.

The following remarks on weather give the direction in which certain kinds of lightning were seen, &c. &c.

Latitude.	Sub-square.	Remarks on Weather.
NOTE. A bar, thus —, separates the Remarks from different Logs.		
9° to 10° N.	92	Rather gloomy, but nothing to previous days (ship from Nd.).
	94	A dry haze round the horizon to an altitude of 15°.
	95	Atmosphere extremely oppressive.—A cloudless sky throughout: hazy 12° above the horizon, with a heavy dew falling through the night.—Sky clearer of visible vapour than I ever remember to have seen it; moon and stars very well defined.
8° — 9° N.	82	Dew from 4 p.m., with beautiful weather.
	83	Thick whitish haze all round.
	87	A heavy dew began to be perceptible about 5.30 p.m., and continued till 9 a.m.
	89	A dense haze all round horizon about 6° in altitude.
7° — 8° N.	70	The same monotonous and misty weather, the horizon distinct enough for observations and nothing more; the air lighter and freer to breathe to-day (ship from North).—Very sultry (two entries).
	73	Thick close weather.—Hazy murky appearance.
	75	Atmosphere keeping very hazy, especially up to 10° from horizon.
	78	Weather very oppressive.

Latitude.	Sub-square.	Remarks on Weather. NOTE. A bar, thus —, separates the Remarks from different Logs.
6° to 7° N.	62	Saw a ship bound to the Nd., but so dense is the haze that although she was only two miles to windward could see nothing but her royals and top-gallant sails.
	63	Thick haze extending all over the sky.—Flash lightning in North.
5° - 6° N.	65	Never experienced the air so close and oppressive as at the present time (wind Sly.).
	52	Sultry (6 entries). Sheet l. in S.S.W.
	55	Very sultry.—Yellow haze.
4° - 5° N.	42	A dense haze in the atmosphere, at times clearing about the zenith.
	43	6 hours' constant rain in torrents; wind at commencement S. by W., changing to N.E.; ship going N.
	45	Incessant t., chain and sheet l., all over the heavens.
	46	Flash l. in E.—Sheet l. in N.—Strong chain l. in E.N.E.
	47	Sheet l. in S.E.
3° - 4° N.	30	Thunder and forked l. to the N.Ed.—Sheet l. in the Ed.
	31	Extremely heavy l. for 4 hours, leaving a blinding effect after the flashes: the wind was variable from the N.Ed., force 3.—A large waterspout.
	33	Excessively hot and sultry.—1 p.m. Lightning shattered the main skysail mast, main-top mast trestle-trees, and combing of mainmast, with other damage. Much l. to Sd. and Nd., wind N. by E.—Sheet l. in a bank of clouds to the Sd.—28th, 1858. A large waterspout passed about 1 mile to leeward, a formidable looking object; if such an one passed over a ship I think it would make a clean sweep. It passed much nearer a brig than to us; she was becalmed while we were going about 2 knots: wind at time, E.N.E.
	35	Chain and sheet l., heaviest from N.W. to N.E. Incessant chain and sheet l. (bluish), with heavy t. all over the heavens.
2° - 3° N.	36	Sheet l. in N.E. and N.W.—Sheet l. in the N.Ed.
	21	Lightning and t. in the N.E. for 2 hours with no squall; wind N. and N.N.W., ship bound to Nd.—Frequent sheet l. in the E.
	22	Very gloomy to Nd., wind E.S.E. (two entries).—Distant t. in the N.E. all day.
	24	A large circle round the moon.
	29	Heavy appearance to the E.S.Ed., but it is all nothing; we got the rain from it, but the wind keeps steady at N. (ship going N.Wly.).—Regular Trade sky, wind N.N.E., 5.
1° - 2° N.	10	Very heavy forked and chain l. in the E., thunder only heard at times.—Thunder, l., and r. all night, with light S.S.W. to E.S.E. wind.—Continued sheet l. in the N.N.W. and N.N.E.—Sheet l. and distant rumbling t. to the E.S.Ed.
	11	Sheet l. in E.S.E. Forked l. and rolling t. in the S.S.W.—A waterspout to the Wd.; several flashes of chain l. from the same cloud.
	12	Sheet l. in Wd.
	13	Sheet l. in N.E.—Faint l. from S.E. to N.—A small waterspout to the W.S.W. in a nimbus.
0° - 1° N.	15	Very black to the N.Ed. and much l.
	00	Sheet l. in N. (two entries).
	01	Nothing dries, regular W. Coast of Africa weather.
	03	Incessant but very distant t., with chain and sheet l. in the E.N.E.
	04	Lightning incessant all round.
	05	Black inky looking clouds passing, giving out bright l. when overhead.
	08	Wind-dog to the Ed.; there were passing showers with squalls.

GENERAL REMARKS.

The following extracts have been made from the March "Remarks" in various logs:

NATURAL HISTORY.

Latitude.	Sub-square.	Remarks on Natural History.
<i>Land Birds and Insects.</i>		
4° to 5° N.	43	A dragon-fly.
2° - 3° N.	22	A small land bird apparently having a red breast, and dark brown and black wings and back.
1° - 2° N.	10	Several land birds.
<i>Cetacea.</i>		
9° - 10° N.	90	A <i>Sperm Whale</i> .
	91	Numerous <i>Sperm Whales</i> .
6° - 8° N.	68	A few <i>Bottle-noses</i> going to the S.Ed.
4° - 5° N.	40	<i>Whales</i> .
3° - 4° N.	34	Some small <i>Cetacea</i> .
1° - 2° N.	12	Several small <i>Whales</i> lying lazily on the surface of the sea.
	13	A school of <i>Whales</i> .
4° - 5° N.	40	<i>Grampuses</i> .
0° - 1° N.	00	A few <i>Grampuses</i> .
6° - 7° N.	69	A few <i>Blackfish</i> .
0° - 1° N.	00	A few <i>Blackfish</i> passed going to the N.Ed.
1° - 4° N.	-	<i>Porpoises</i> were only seen in sub-squares 31*, 10, 11, and 13. In s.-s. 11, the log says Great schools of porpoises, many hundreds. The numbers of the sub-squares show that they were only seen in the S.En. corner of the Square, where the sea was at its highest temperature.
<i>Fish, &c.</i>		
0° - 7° N.	-	<i>Albicoræ</i> were seen in s.-ss. 63 and 09.
0° - 10° N.	-	<i>Bonitos</i> " " 90, 72, 78, 63, 65, 67, 56, 34, 29, 11, 00, 03, 05, 09.
0° - 7° N.	-	<i>Dolphins</i> or <i>Coryphæna</i> were seen in s.-ss. 63, 34, 15, 02, 03. They were very small in s.-s. 34.
0° - 10° N.	-	<i>Flying Fish</i> were seen in twenty-four sub-squares; 19 times in the Nn. and 8 in the Sn. half of the square. They were very abundant in s.-ss. 72, 52, and 05; and abundant in 90, 92, 97, 78, 79, so that they seem to have preferred the Nn. or cooler part of the square; but it must be remembered that they are most frequently seen where there is wind, as the motion of the ship starts them. In s.-s. 90 is the following remark. Several bonitos and a large number of small flying fish similar to those seen in the vicinity of the West India Islands.
0° - 7° N.	-	<i>Skipjacks</i> were seen in s.-ss. 63, 67, 00, 03.
1° - 10° N.	-	<i>Sharks</i> " " 92, 53, 35, 21, 23, 12. In s.-ss. 53 and 35 there were several young sharks. In 21 a young shark was caught.

* One dot indicates that the creatures were abundant; two that they were very abundant.

Latitude.	Sub-square.	Remarks on Natural History.
4° to 9° N.	- -	<i>Portuguese men-of-war</i> were seen in s.-ss. 81, 61, 69, 57, 43. In s.-s. 43 they were fine as well as abundant
Remarks.		
0° - 1° N.	05	Small brown <i>Medusæ</i> in great numbers.
9° - 10° N.	94	<i>Pyrosoma</i> about 6 ins. long and $\frac{1}{2}$ to $\frac{3}{4}$ of an inch in diameter, being hollow in the centre. In the water they looked like thousands of bright stars.
Sea Birds.		
0° - 9° N.	- -	<i>Stormy Petrels</i> were seen twenty times, but only twice in the Nn. half of the square. They were abundant in s.-ss. 43, 26, 11, and 00. In s.-s. 11, Nearly a hundred stormy petrels about the ship. They seem to prefer the warmer water of the Wly. current due to the S.E. Trade.
1° - 9° N.	- -	<i>Birds.</i> (Supposed to have been Sea Birds), were seen in s.-ss. 97, 57, 40, 31, 34, 38, 19. In s.-s. 40, "Sea birds screeching at night, not seen during the day."

FALLING STARS.

There are 13 entries of Falling Stars, distributed over eight years between 1859 and 1871. There are three entries in 1871, two in each of the years 1859, 1863, and 1869, and only one in each of four other years; but it must be remembered that observers were very unequally distributed throughout the eight years. The following remarks may be interesting.

Sub-square.	Hour.	Day.	Year.	Remarks on Falling Stars.
73	8 p.m.	5th	1859	Several small meteors falling to N.E., and others to the S.Wd.
32	Midt.	18th	1861	Several stars shooting in different directions.
10	8 p.m.	12th	1866	Very bright shooting stars from the zenith to about S.E.
04	4 a.m.	5th	1869	A shower of meteors seen.
46	10 p.m.	8th	1871	Several stars shot to the N.E. from the zenith.
35	—	15th & 16th	1871	A few stars shot in different directions during the night.

TEMPERATURE OF RAIN AND AIR.

	Sub-square.	Temperature of Rain.	Temperature of Air.
	51	74°·5	74°·8
	43	75°·0	75°·9
	32	74°·3	74°·0
	34	75°·0	77°·0
	20	75°·5	75°·8
	21	75°·0	81°·2
	22	72°·7	74°·1
	12	75°·0	78°·7
	01	75°·0	75°·7
	09	74°·0	75°·8
		10)46°·0	10)63°·0
	Mean	74°·6	76°·3 Difference 1°·7

The mean temperature of rain seems to have increased since February, whilst the difference has decreased.

Sub-square.	VARIOUS.
89	Passed close to an immense turtle.
69	10th, 1863. The sails are discoloured by dust (ship going Nly., wind N.Ely).
40	Patches of spawn having the appearance of white froth. Note.—The float of the <i>Ianthina</i> presents the appearance alluded to in the above remark, as its shell is not seen from a ship's deck.
34	Caught a number of small creatures of remarkable beauty in colour.
14	The small shells caught in my net are very beautiful in colour and form (<i>Pteropoda criseis</i>). (The last two remarks are from the same log.)
01	Saw a devil fish.

BEST ROUTES FOR CROSSING THE EQUATOR.

By meaning the mean forces of all winds in the tables for March in Appendix B, it is shown that they are generally stronger to the Wd. than to the Ed. of the Cape Verd Islands; between 16° and 20° N. they are, however, stronger to the Ed. than to the Wd., but between 16° and 10° N. they are strongest in the Wn. half of the square. S.Ely. winds are more common in the Wn. than in the En. half of the square, but they are chiefly to the Ed. of E.S.E. N.Wly. winds are most frequent in the Nn. part of the square on the Wn. side of the islands, and in the Sn. part of the square on their En. side.

The following Table shows the Navigator the three points of each quarter of the compass from which the wind prevails in each half of the square. For instance, it proves that the N.Ely. winds of the Wn. half of Square 39 are much more Ely. than those of the En. half; also that the S.Ely. winds are generally East, and seldom to the Sd. of E.S.E. Appendix B should be consulted for the percentage of each wind before examining Table 12, as the winds in some quarters have so small a percentage that they are of little importance to the Navigator.

TABLE 12.

The Direction of the three Prevailing Winds of each quarter of the compass, in each half of Square 39. They are in the order of their prevalence. A dash under a letter or figure indicates extreme prevalence.

Latitude.	N. to E. b. N., or N.Ely. Winds.		E. to S. b. E., or S.Ely. Winds.		S. to W. b. S., or S.Wly. Winds.		W. to N. b. W., or N.Wly. Winds.	
	Wn. half 25° to 30° W.	En. half 20° to 25° W.	Wn. half 25° to 30° W.	En. half 20° to 25° W.	Wn. half 25° to 30° W.	En. half 20° to 25° W.	Wn. half 25° to 30° W.	En. half 20° to 25° W.
	Points from North.	Points from North.	Points from South.	Points from South.	Points from South.	Points from South.	Points from North.	Points from North.
18° to 20° N.	5, 4, 3	3, 2, 6	4, 6, 7	5, - -	7, 3, -	6, 4, -	1, 7, 2	8, 1, 3
16° - 18° N.	4, 3, 5	2, 1, 3	8, 7, 6	8, - -	6, - -	- - -	5, 6, 1	1, - -
14° - 16° N.	3, 4, 2	N, 1, 2	7, 8, 6	- - -	- - -	- - -	- - -	4, 2, -
12° - 14° N.	5, 4, 6	N, 1, 2	8, 7, 6	8, 7, -	- - -	- - -	- - -	1, 2, -
10° - 12° N.	3, 4, 5	1, N, 2	8, 6, 5	8, 6, 7	- - -	- - -	2, - -	1, 6, 3

The accompanying Chart for March, and the Diagram on its lower right-hand corner, show that from 2° to 10° N. the prevailing winds are Nly., getting stronger and more Ely. as you pass from the En. to the Wn. side of the square. The Chart also shows that on the En. side of the square there is much light N.Wly. wind, which is particularly trying to the homeward-bound ship. (Before consulting the Chart it may be well to read the last paragraph on page 9, which precedes the remarks for

January.) The Chart and Diagram also show that S.Ely. winds prevail from 0° to 2° N., and that they are stronger on the Wn. than on the En. side of the square. From the Equator to 4° N. there is a decided Wly. current; from 4° to 10° N. the prevailing current is Wly., but Ely. currents are common, especially on the En. side of the square. Table 4 for March shows that in the zone between 4° and 5° N. there is 17 per cent. more Ely. than Wly. current.

Appendix C. still shows that in Square 303 there is a paucity of observations in the Wn. part, between 0° and 5° S. Pencil lines drawn through the largest percentage for each degree of latitude show that between 33° and 35° W. the prevailing winds are Ely. and even N.Ely. in the Nn. part of the square, drawing more S.Ely. as you proceed to the southward. In the En. part, from 0° to 2° S., the prevailing winds are E. by N. and N.W., but from 2° to 10° S. they gradually change from S.E. to E.S.E. The mean direction of the prevailing winds in the Wn. part is East, whilst that of the prevailing winds in the En. part is S.E. by E. $\frac{1}{2}$ E. By taking a mean of the forces of prevailing winds in the two parts it is shown that each is about 4.1; the mean of the mean forces of all winds is a little higher in the Wn. than in the En. part, but on analyzing the difference in the force of wind in the two parts, it is found that from 0° to 6° S. the mean force of wind is greatest in the Wn. part, whilst from 6° to 10° S. it is greatest in the En. part. Now, as Cape St. Roque is in 5° 28' S., this change takes place after passing that Cape. In the western part there is 11 % of variable winds between 6° and 7° S.

The above facts show that the *Outward-bound* ship should pass to the Wd. of the Cape Verd Islands and stand to the Sd. in the Wn. half of Square 3, standing boldly on when the wind comes S.Ely., knowing that the wind is generally favourable for getting to the Sd. in the Nn. part of Square 303. But the Navigator must remember that after passing Cape St. Roque the winds are lighter near the land than they are further to the Ed.

The iron ship "Victoria Nyanza," Captain A. A. Jones, crossed the Equator about 9 p.m. of the 9th of March in 29° 46' W. At noon of the 10th she was in 1° 1' S., 29° 43' W.; on the 11th, in 2° 11' S., 29° 0' W.; on the 12th, in 2° 39' S., 29° 4' W.; 13th, 3° 20' S., 28° 52' W.; 14th, 5° 13' S., 30° 6' W.; 15th, 7° 40' S., 31° 50' W.; 16th, 10° 16' S., 32° 50' W. From 8 p.m. of the 11th to noon of the 13th the wind was light Sly. for 10 hours, and then light and variable; from noon of the 13th it was steady, S.Ely. Her currents were slight and Wly., none stronger than 15 miles in 24 hours. This shows that March is not always a favourable month for getting to the Sd. after crossing the Equator. The "Victoria Nyanza" had light Sly. and variable winds down to 3° S. in Square 302, which lies just to the Ed. of Square 303.

The *Homeward-bound* ship should cross the Equator somewhere between 26° and 33° W., so as to avoid the N.Ely. winds, which are common further to the Westward, near Cape St. Roque; and also the light N.Wly. winds and calms which abound further to the Eastward, on the eastern side of Square 3.

APRIL.

Barometer.—The red isobar (see the Diagram in the lower right-hand corner of the Chart) shows that the lowest pressure is now in the S.En. corner of the square.

The highest mean pressure in the lateral strips (29·968) is still between 9° and 10° N., where there has been a decrease of ·003 since March; in all other lateral strips the pressure has increased, the largest increase (·019) being between 2° and 3° N. The lowest mean pressure in the lateral strips (29·926) lies between the Equator and 1° N. When it is considered that the prevailing wind between 2° and 4° N. is N.Ely. in April, and S.Ely. in May, it is interesting to notice how the rising barometer in that zone is preparing for the Sly. wind, as it must be higher there than in the zone immediately to the Nd., before the prevailing wind can be Sly.

The mean of the means in the lateral strips (29·945) indicates that the Mean Pressure of the square has increased about ·011 in. since March. A comparison of the vertical strips for the two months shows that the increase of pressure has been about ·003 in. greater in the Wn. than in the En. half of the square. A similar comparison shows that the temperature of both air and sea has increased about 0°·4 more in the Wn. than in the En. half. This is not in accordance with previous months, when the greatest *increase* of temperature is accompanied by the greatest *decrease* of pressure. The general *increase* of pressure with an *increase* of temperature is remarkable; perhaps it is related to the Nn. progress of the S.E. Trade which comes on in May, when it gains 2° on the N.E. Trade, driving it back to 4° N. Still the isobar of lowest pressure is over the same part of the sea as the isotherms of hottest air and sea.

The direction of the isobars is rather more N.Ely. than that of those for previous months, whilst the direction of the wind arrows is very similar. This makes the angle between the wind arrows and isobars rather more acute than it was in February and March.

Air Temperature.—The air isotherms are very similar to those for March, that of 81° is, however, between 4° and 6° N. instead of being near the Equator. The Wn. ends still droop to the Sd. as though they were affected by the stronger N.Ely. wind there.

The mean temperatures of lateral strips compared with those for March show that the greatest increase (0°·8) has taken place between 5° and 6° N., whilst there has been a slight decrease between the Equator and 2° N. where the S.Ely. wind prevails: this might be expected, for the sun having been a month to the Nd. of the Equator the air of the S.E. Trade would be cooler. The Mean Temperature of the whole square (79°·3) shows an increase of 0°·3 since March.

Dry and Damp Bulbs.—The least difference of dry and damp bulbs shown in the means of lateral strips is 3°·1, it lies between 2° and 3° N. where the N.E. and S.E. winds

have nearly an equal percentage. The greatest (4°·3) is between 8° and 9° N. The mean differences in the vertical strips show that the En. is damper than the Wn. half of the square. The mean for the whole square (3°·7) has scarcely changed since March.

Sea Temperature.—The isotherms of sea surface temperature agree most remarkably with those for the air, even to the dip between 22° and 24° W., and the rise again between 24° and 26° W. When we consider that they are drawn from independent observations, taken with different thermometers, their agreement supports the truth of this peculiarity. The Mean Surface Temperature of the whole square (80°·3) indicates an increase of 0°·4 since March.

April has the hottest air and sea which appear during the prevalence of Nly. winds in the square. In s.-s. 50, the mean of 27 observations of *air* temperature amounts to 82°·0, whilst in s.-s. 20 the mean of 43 observations of *sea* temperature is as high as 82°·6.

Specific Gravity.—The lowest specific gravity in the means of lateral strips is 1·0265, it lies between 3° and 5° N.; between 3° and 4° N. there is the largest percentage of rain. From this zone it increases to 1·0274 between 7° and 9° N., and to 1·0268 between the Equator and 1° N.

The Mean for the square (1·0269) shows a slight increase since March.

The means of vertical strips indicate that the specific gravity is slightly greater in the Wn. than in the En. half of the square; there is more rain in the En. than in the Wn. half, which may account for this difference.

WIND.

TABLE 1.—LATERAL STRIPS.

Lateral Strips. 10° of Longitude by 1° of Latitude.	No. of Observations.	Mean Force of Strip.	N. to E. by N. or N.Ely.		E. to S. by E. or S.Ely.		S. to W. by S. or S.Wly.		W. to N. by W. or N.Wly.		Variables.		Calms.	Prevailing Wind.		Strongest Wind.*	
			%	Mean Force.	%	Mean Force.	%	Mean Force.	%	Mean Force.	%	Mean Force.		No. of Observations. Direction.	Mean Force.	No. of Observations. Direction.	Mean Force.
9° to 10° N. -	120	3.7	85	3.8	2	4.0	—	—	12	3.2	—	—	1	N. 23	3.5	N.E. by N. 14	4.7
8° - 9° N. -	143	3.7	85	3.8	—	—	—	—	15	3.0	—	—	—	N.N.E. 29	3.6	N.E. by E. 12	4.3
7° - 8° N. -	171	3.7	89	3.8	1	3.5	—	—	9	2.4	1	3.5	—	N.E. by N. 34	4.1	N.E. 18	4.5
6° - 7° N. -	228	3.4	80	3.8	1	1.0	1	3.0	16	2.2	2	2.9	—	N.E. by N. 40	4.3	N.E. by N. 40	4.3
5° - 6° N. -	299	3.4	73	3.8	4	3.1	1	2.5	13	2.6	4	2.8	5	N.N.E. 49	4.2	N.N.E. 49	4.2
4° - 5° N. -	367	2.9	66	3.4	7	2.6	4	2.3	11	2.6	6	2.0	6	N.E. by N. 48	3.7	E. by N. 6	3.8
3° - 4° N. -	423	2.3	49	3.0	15	2.6	8	1.8	7	2.0	8	2.2	13	N.N.E. 43	3.1	N.E. by N. 31	3.3
2° - 3° N. -	450	2.1	31	2.7	25	2.6	10	1.8	9	2.1	11	2.1	14	N.N.E. 28	2.7	E.N.E. 16	3.3
1° - 2° N. -	440	1.9	19	2.5	35	2.7	10	1.8	8	1.8	10	1.7	18	E.S.E. 29	2.7	S.E. by S. 15	3.2
0° - 1° N. -	345	2.4	15	2.7	48	3.0	9	2.1	5	2.0	11	2.4	12	S.E. 36	3.1	E. 18	3.4

TABLE 2.—VERTICAL STRIPS.

Vertical Strips. 10° of Latitude by 1° of Longitude.	No. of Observations.	Mean Force of Strip.	N. to E. by N. or N.Ely.		E. to S. by E. or S.Ely.		S. to W. by S. or S.Wly.		W. to N. by W. or N.Wly.		Variables.		Calms.	Prevailing Wind.		Strongest Wind.*	
			%	Mean Force.	%	Mean Force.	%	Mean Force.	%	Mean Force.	%	Mean Force.		No. of Observations. Direction.	Mean Force.	No. of Observations. Direction.	Mean Force.
20° to 21° W.	400	2.4	29	3.3	23	2.8	10	1.8	23	2.3	4	2.2	11	N. 41	3.1	E.S.E. 8	4.3
21° - 22° W.	362	2.2	30	2.6	22	2.8	7	2.1	18	2.4	11	1.9	12	N. 31	2.3	S.E. by E. 7	3.5
22° - 23° W.	473	2.2	38	2.9	16	2.7	10	1.9	15	2.4	7	2.1	14	N. 42	2.8	E. by S. 5	3.7
23° - 24° W.	381	2.6	51	3.1	20	2.6	5	1.7	6	2.8	9	2.3	9	N. 38	3.0	N.N.W. 9	3.4
24° - 25° W.	351	2.6	49	3.3	22	2.8	3	1.8	8	2.1	9	2.0	9	N.N.E. 34	3.4	N.E. by E. 11	3.7
25° - 26° W.	320	2.7	55	3.3	19	2.8	5	2.0	1	2.6	10	2.1	10	N.E. by N. 35	3.5	E.N.E. 12	3.9
26° - 27° W.	227	3.4	74	3.8	16	2.7	1	1.5	2	2.3	4	2.3	3	N.E. by N. 32	4.0	E.N.E. 11	4.5
27° - 28° W.	165	3.5	79	3.8	14	2.9	2	2.3	1	0.8	1	1.5	3	N.N.E. 37	4.3	N.N.E. 37	4.3
28° - 29° W.	161	3.7	83	3.9	6	3.3	1	4.0	2	2.8	4	3.4	4	N.E. by N. 45	4.2	N.E. 16	4.6
29° - 30° W.	146	4.0	86	4.3	9	3.1	2	2.8	—	—	1	1.5	2	N.E. by N. 46	4.4	N.E. 30	4.5

* In recording the Strongest Wind in a Strip, weight has been given to the number of observations; otherwise the direction and force of a single squall would frequently appear in this column.

By comparing the means of the percentages in the *lateral* strips (Table 1) with those for March the following result is obtained for the whole square.

N.Ely. wind 59 % and decreased about 3 % since March.

S.Ely. „ 14 „ „ „ 2 „ „

S.Wly. „ 4 „ and no change „

N.Wly. „ 11 „ and increased about 4 „

Variables 5 „ and no change „

Calms 7 „ and increased about 1 „

The Mean Force for the whole square (3.0) shows no change since March, but on comparing the forces in the various strips given in Table 1, a slight increase is shown in the force of N.Ely. and S.Ely winds between 4° and 6° N., and again between 0° and 1° N., whilst they have decreased in nearly all other strips. The prevailing wind arrows on the Diagram agree with those for March, but it will be seen that the N.E. wind prevails to the Equator in the S.Wn. corner of the square. This is the only case in which it does so; in May the S.E. wind prevails to 4° N.

The remarkable difference between the direction and force of the N.E. Trade on the two sides of the square is still maintained; this is well shown by the Diagram, Table 2, and the En. and Wn. strips of the published Chart. The vertical strips (Table 2) show a large percentage of N.Wly. wind between 20° and 23° W., they and the Chart also show a steady increase in the mean force of the wind as you pass from the En. to the Wn. side of the square.

TABLE 3.

Latitude.	s.-s.	Winds, Force 7 or upwards, but not Squalls.	Direction of Squalls and Heavy Squalls.										s.-s.	REMARKS.
			(All Squalls Force 7 or upwards are considered to be heavy.) (All Squalls on either side of N., S., E., or W., are given to their re- spective quarters, so that there are fewer from the above-named points than from the quarters.)											
			N.	N.E.	E.	S.E.	S.	S.W.	W.	N.W.				
			Heavy.	Heavy.	Heavy.	Heavy.	Heavy.	Heavy.	Heavy.	Heavy.	Heavy.			
9° to 10° N.	—	- - -	-	-	-	-	-	-	-	-	-	-	99	Hollow whistling sound in the N.E. wind.
8° - 9° N.	—	- - -	-	-	-	-	-	-	-	-	-	-	87	Strong N.E. Trade, force 6.
7° - 8° N.	—	- - -	-	-	1	-	-	-	-	-	-	-	—	—
6° - 7° N.	—	- - -	-	-	1	-	-	-	-	-	-	-	68	Sn. limit of N.E. Trade, 26th.
5° - 6° N.	—	- - -	-	-	1	-	1	1	2	-	-	1	53 to 6	Sn. limit of N.E. Trade, 26th, 14th, 26th.
													55	A heavy arch of cloud rose rapidly from S. by W. with heavy r. and q. for an hour, after which it cleared and the N.E. wind returned.
													56	A most furious squall from S.E.; wind hauled to East.
													57	Squall, force 6, in which wind suddenly shifted from N.E. by N. to E. by S.
4° - 5° N.	49	N.E. 6, to 7, puffy.	-	-	3	1	-	1	2	3	-	1	41 to 46	Sn. limit of N.E. Trade, 10th, 30th, 14th, 26th, 30th, 18th, 25th.
													40	Squalls of force 7, all travelling bodily from the Sd., wind during the squalls E. to S., after them generally from the Nd. or N.E.
													41	A N.E. squall struck the ship carrying away the fore and main topgallant masts. Its strength lasted about 6 minutes; it was followed by a moderate Trade and hazy weather.
													42	A very severe squall from E.S.E., ship nearly before the wind, topgallant sails in, foot ropes of topsails broke.
													45	Stiff squalls, force 7 (2 entries).
													46	Got the N.E. Trade without having had any calms.
													48	Tremendous looking squalls brewing, but resulting in passing showers.
3° - 4° N.	38	N.E. 7	-	-	2	2	-	-	1	1	1	-	32 to 35	Sn. limit of N.E. Trade, 4th, 9th, 21st, 16th, 4th.
													33	A very heavy S.Ely. squall.
													38	Wind flies from N.E. to S.E. and S. by E., never steady for half an hour; ship going from 1 to 9 knots as its force varies.
													39	Wind during squall S.E. by E., force 7, but quickly changing again to N.E. and N. with very heavy rain.
2° - 3° N.	—	- - -	-	4	1	-	-	-	1	1	-	-	20 to 24	Sn. limit of N.E. Trade, 13th, 13th, 14th, 4th.
													21	Nn. limit of S.E. Trade, 17th.
													20	Nly. wind very puffy out of a clear sky.
													21	17th. Got S.E. Trade after only about 2 hours' calm.
													22	A very sharp squall from E. by S.

TABLE 3.—continued.

Latitude.	s.-s.	Winds, Force 7 or upwards, but not Squalls.	Direction of Squalls and Heavy Squalls.								s.-s.	REMARKS. NOTE.—A bar, thus —, separates the Remarks of different Logs. The dates of Trade limits are in the order of the sub-squares in which they occurred, beginning with the most Eastern one.					
			(All Squalls Force 7 or upwards are considered to be heavy.) (All Squalls on either side of N., S., E., or W., are given to their re- spective quarters, so that there are fewer from the above-named points than from the quarters.)														
			N.	N.E.	E.	S.E.	S.	S.W.	W.	N.W.							
			Heavy.	Heavy.	Heavy.	Heavy.	Heavy.	Heavy.	Heavy.	Heavy.							
2° to 3° N.												24	For the last few nights we have had less wind than in the day. (Ship from south).				
												25	8 a.m., 5th, 1856. Light airs, rain commenced; almost immediately after a violent tornado burst on the ship. Topgallant sails and main topsail split to pieces; the violence of the wind continued about an hour.				
												29	A continuous very heavy squall, extreme force 8, with drenching showers of cold rain.				
1° - 2° N.	—	- - -	2	1	-	-	1	-	2	-	1	-	-	-	-	12	Nn. limit of S.E. Trade, 20th, 11th, 22nd.
																12	After a sharp squall from N.N.E., force 7, the wind fell light and veered to S.E. by S. again.
0° - 1° N.	—	- - -	-	-	2	-	-	-	2	-	-	-	-	-	-	07	Sn. limit of N.E. Trade, 29th.
																00 & 02	Nn. limit of S.E. Trade, 21st, 16th.
																01	No light winds between the Trades.
																04	1st, 1858. A steady S.E. Trade after 13 days from the N.E. Trade, which was lost in 6° 40' N. and 22° 15' W.
Sum - -		2, both N.Ely.	2	5	10	4	1	2	9	7	2	1	-	1	-	1	-

NOTE.—The 2 strong N.E. winds were on the Wn. side of the square.
 4 of the 5 heavy Nly. squalls were on the En. side of the square.
 6 of the 7 Nly. squalls were on the En. side of the square.
 9 of the 14 N.Ely. squalls were on the Wn. side of the square: the heavy ones were equally divided between the two halves of the square.
 11 of the 16 S.Ely. squalls were on the En. side of the square, 5 of the 7 heavy were also on the En. side.
 All the Sly. squalls were between 20° and 21° W.

Table 3 compared with the corresponding one for March shows a very great decrease in the number of N.Ely. winds of force 7 or upwards. Its remarks give the sub-squares in which some very severe squalls were experienced. Its note shows how Nly., Sly., and S.Ely. squalls prevailed on the En. side of the square, whilst N.Ely. were more common on its Wn. side.

CURRENTS.

TABLE 4.—LATERAL STRIPS.

Lateral Strips. 10° of Longitude by 1° of Latitude.	No. of Observa- tions.	Mean Rate.	N. to E. by N. or N.Ely.		E. to S. by E. or S.Ely.		S. to W. by S. or S.Wly.		W. to N. by W. or N.Wly.		None %	Prevailing Current.		Strongest Current.*	
			%	Mean Rate.	%	Mean Rate.	%	Mean Rate.	%	Mean Rate.		(No. of Observations. Direction.	Mean Rate.	Direction.	Rate.
9° to 10° N.	28	10	14	11	18	18	22	14	14	14	32	S.S.E. ²	27	S.S.E.	43
8° - 9° N.	22	8	9	18	9	20	14	16	18	14	50	W.N.W. ²	14	N. by E.	28
7° - 8° N.	31	10	3	7	16	11	26	16	26	15	29	W. ³	16	S.W. by S.	25
6° - 7° N.	36	11	11	10	8	17	36	17	17	16	28	S.W. ⁴	16	S. by W.	28
5° - 6° N.	48	14	8	10	19	27	21	17	31	14	21	W. by N. ⁵	13	E. by S.	55
4° - 5° N.	43	12	9	10	23	14	30	20	12	15	26	W. by S. ³	23	W. by S.	36
3° - 4° N.	44	14	18	13	11	22	21	20	27	20	23	E. by S. ⁵	22	E. by S.	39
2° - 3° N.	49	18	20	18	8	12	25	15	37	25	10	W. ¹¹	29	W.	55
1° - 2° N.	59	19	7	11	15	17	20	19	43	29	15	W. ¹²	30	N.W. by W.	79
0° - 1° N.	55	17	18	26	13	18	16	20	37	19	16	W. ⁷	22	E. by N. (twice.)	46

TABLE 5.—VERTICAL STRIPS.

Vertical Strips. 10° of Latitude by 1° of Longitude.	No. of Observa- tions.	Mean Rate.	N. to E. by N. or N.Ely.		E. to S. by E. or S.Ely.		S. to W. by S. or S.Wly.		W. to N. by W. or N.Wly.		None.	Prevailing Current.		Strongest Current.*	
			%	Mean Rate.	%	Mean Rate.	%	Mean Rate.	%	Mean Rate.		No. of Observations. Direction.	Mean Rate.	Direction.	Rate.
20° to 21° W.	57	14	28	16	26	17	18	17	10	19	18	N.	11	E. by N.	46
21° - 22° W.	49	13	16	13	20	18	23	19	18	17	23	W.N.W.	14	W.	40
22° - 23° W.	78	17	19	18	26	20	23	18	18	22	14	W. by S.	23	E. by S.	55
23° - 24° W.	57	12	14	14	4	10	16	14	35	23	31	W.	22	N.W. by W.	79
24° - 25° W.	41	17	5	17	12	19	20	18	41	26	22	W.	31	W.	55
25° - 26° W.	36	12	3	6	—	—	17	18	47	19	33	W.	24	W.	45
26° - 27° W.	31	17	3	16	—	—	45	21	36	18	16	W.	19	W.	49
27° - 28° W.	24	11	—	—	12	18	21	13	38	16	29	W.	22	W.	28
28° - 29° W.	24	14	—	—	8	13	46	18	21	22	25	W.	23	W.	40
29° - 30° W.	18	13	—	—	11	13	17	18	50	17	22	N.W.	19	S.W. by S.	26

* The Strongest Current in each Strip is here given, as it is important to the Navigator to know the extreme to which he is liable.

Table 4 shows that N.W. currents prevail from the Equator to 4° N.; between 1° and 2° N. their mean speed is 29 miles in 24 hours.

From 4° to 10° N. S.Wly. currents are most frequent.

Between 4° and 5° N. there is 23% of S.Ely. current.

Table 5 and the En. and Wn. strips of the Chart show that nearly all the Ely. current is on the En. side of the square, and that there is a larger percentage of Ely. than of Wly. between 20° and 23° W.; this fact is indicated by the red current arrows in the small Diagram on the lower right-hand corner of the Chart.

Between 4° and 5° N. there are more remarks on Ely. currents than on Wly., and current rips were also more frequently experienced there than elsewhere.

The following remarks are considered worthy of extraction :—

Latitude.	Sub-square.	Remarks on Currents.
		NOTE. A bar, thus —, separates the Remarks from different Logs.
9° to 10° N.	90	Very strong rippings from 1 to 2 miles in extent, apparently going N.; wind N.N.W. 3.
	92	The hissing of the current rips heard distinctly. Current rips as far as the eye can see. Current rips to appearance form a kind of circular motion on the water.
8° - 9° N.	80	Strong rippings about 2 miles in length (2 entries).
	81	Strong current rips sending the spray on deck.
	82	Passed through several tide rips E. and W.; wind N. 3.
7° - 8° N.	70	Strongly confused water like tide rips which can be heard a mile off, still the reckoning shows no current.
	71	Current rips seem to have a circular motion on the water. (This remark is from the same log as that in s.-s. 92.)
6° - 7° N.	60	Frequent rippings apparently running in various directions.
	62	Strong ripples making a great noise all night.
	65	Sea topping up from S.E. by E. as if caused by a current, wind N.E. by E.
	67	Tide rips again from S.W. by S. to N.E. by N.; wind N. by E. 2. (Ship from Sd.)
5° - 6° N.	50	Ripple from N.N.E.; wind N.N.E. 4.—There is still strongly confused water like tide rips, which can be heard a mile off. (Ship from Nd.)
4° - 5° N.	40	The eddies and rips which extend N. and S. and travel Wd. are still visible though not so much as of late; wind E. 2. (Ship from Nd.)
	42	A strong rippling in an E. and W. direction, giving the appearance of a very strong tide; wind N.E. 3.
	44	Tide rips frequently passing from N. to S.; wind N.E. 2 to 3.
	45	Current ripple setting to the Nd.
3° - 4° N.	32	Tide rips continually passing from N.E. to S.W., water looks as if boiling; temperature during commotion 82°·4, afterwards 81°·6; wind variable 1.
2° - 3° N.	21	Strong rippings E. and W. direction, appearance of a very strong tide.—Passing through long streaks of yeasty foam lying N.Ely. and S.Wly.; wind E.S.E. 1.
	27	Passed across a wavy line of foam extending in a general N.E. and S.W. direction; wind E. by N.
		Note.—Nearly all the above remarks on current ripples were made on the En. side of the Square. It must, however, be borne in mind that observations of all kinds were most frequent on its En. side.

SEA.

“Very luminous” and “very blue” seas were most frequently seen between the Equator and 1° N. The sea was “green” four times between 1° and 5° N.

Latitude.	Sub-square.	Remarks on Sea.
NOTE. A bar, thus —, separates the Remarks from different Logs.		
9° to 10° N.	96	Specific gravity in ripples 1·0274, out of them 1·0272.
7° - 8° N.	79	Passing during the night very luminous lumps of phosphorescent matter, such as I have seldom seen.
6° - 7° N.	69	Temperature at surface and 19 feet below it 78°. Sea like a boiling cauldron.
5° - 6° N.	57	" " " 78°.
4° - 5° N.	45	" " " 80°.
3° - 4° N.	32	Ship appears to be moving slowly through liquid fire. Temperature at surface 80°, at 19 feet below it 79°.
2° - 3° N.	33	Temperature at surface 83°, at 90 fathoms 74°.
1° - 2° N.	20	Temperature at surface and 19 feet below it 81°·5.
	10	" " " 81°·5. At 4 a.m. after the commencement of rain the sea became less luminous.
	13	Temperature at surface and 20 fathoms below it 83°.
0° - 1° N.	00	" " 81°, 19 feet below it 80°·5.
	01	" " 81°, " 80°·5.

The Eastern and Western strips of the Chart show that there is much more swell from some Nn. quarter on the Wn. than on the En. side of the Square, whilst the reverse is true with regard to swells from Sn. quarters. On the Wn. side of the square swells from some Nn. quarter still prevail over all others, down to the Equator, which may be expected considering the prevailing N.Ely. wind there.

CLOUDS.

Tables 6, 7, and 8, with remarks on clouds, are compiled from the data for 1° sub-squares.

TABLE 6.—LATERAL STRIPS.
PERCENTAGES of EACH FORM, and MEAN AMOUNT of all CLOUDS.

Lateral Strips. 10° of Longitude by 1° of Latitude.	No. of Observa- tions.	Upper Clouds.			Lower Clouds.				Amount, 10 being "Com- pletely Clouded."	
		Cir.	Cir.-c.	Cir.-s.	Cum.	Cum.-s.	Str.	Nim.	No. of Obs.	Mean.
		%	%	%	%	%	%	%		
9° to 10° N. -	83	22	6	12	54	11	8	4	93	3·8
8° - 9° N. -	99	19	9	17	59	1	10	2	113	4·3
7° - 8° N. -	119	11	22	15	42	9	12	3	141	4·0
6° - 7° N. -	159	16	23	11	48	9	10	2	177	4·7
5° - 6° N. -	194	10	23	12	48	12	15	7	214	5·3
4° - 5° N. -	241	9	16	9	42	17	17	22	273	6·1
3° - 4° N. -	273	9	15	14	40	15	21	25	298	6·6
2° - 3° N. -	301	6	17	7	36	23	15	31	299	6·2
1° - 2° N. -	308	13	16	9	47	18	13	27	300	6·1
0° - 1° N. -	236	14	12	12	53	16	13	23	247	5·3

TABLE 7.—VERTICAL STRIPS.
PERCENTAGES of EACH FORM, and MEAN AMOUNT of all CLOUDS.

Vertical Strips. 10° of Latitude by 1° of Longitude.	No. of Observa- tions.	Upper Clouds.			Lower Clouds.				Amount, 10 being "Com- pletely Clouded."	
		Cir.	Cir.-c.	Cir.-s.	Cum.	Cum.-s.	Str.	Nim.	No. of Obs.	Mean.
		%	%	%	%	%	%	%		
20° to 21° W.	288	14	9	7	44	24	12	16	305	5·3
21° - 22° W.	253	10	10	4	43	16	15	22	252	5·4
22° - 23° W.	285	14	11	11	34	18	18	13	301	5·6
23° - 24° W.	287	11	23	18	48	12	19	22	296	5·7
24° - 25° W.	232	12	23	7	45	13	11	26	246	5·8
25° - 26° W.	205	8	15	14	44	13	13	21	220	5·9
26° - 27° W.	145	13	20	14	49	12	10	19	155	5·7
27° - 28° W.	119	9	19	17	60	9	16	23	132	5·2
28° - 29° W.	104	10	23	10	50	13	14	6	123	5·4
29° - 30° W.	95	5	23	15	51	12	15	9	125	5·3

A mean of the 10 strips in Table 6, compared with that for March, shows that the Mean Amount of Cloud for the whole square (5·2) has slightly decreased; the greatest decrease (0·5) lies between 5° and 7° N., and again between 2° and 3° N.

The percentage of Nimbus for the whole square has decreased 4 since March, but all the decrease lies between 2° and 7° N., where it averages 8 per cent.; to the Nd. and Sd. of this zone there has been a slight increase. Table 1 shows that what increase there has been in the mean force of wind since March lies in part of the same zone, viz., between 4° and 6° N., indicating that the amount of Nim. decreases as the force of wind increases.

By comparing Table 7 with that for March, it is shown that the amount of Nimbus has increased between 24° and 28° W. but decreased to the Ed. and Wd. of those meridians. Nim. and Cum.-s. are still more abundant in the En. than in the Wn. half of the square.

TABLE 8.

The following Table is derived from the Remarks on Clouds in April:

NOTE.—All cloud entries from N. to E. b. N. inclusive have been given to the N.En. quarter.
" E. b. S. to S. " S.En. "
" S. b. W. to W. b. S. " S.Wn. "
" W. b. N. to N. b. W. " N.Wn. "

Upper clouds from E. or W. have been extracted in the Remarks. Lower clouds flying with the wind have not been recorded.

Quarters from which the Clouds and Wind came.		Lower Clouds.			Clouds (doubtful whether upper or lower).			Upper Clouds.		
Clouds from.	Wind from.	Total No. of Observations.	No. in Nn. Half of Square.	No. in Sn. Half of Square.	Total No. of Observations.	No. in Nn. Half of Square.	No. in Sn. Half of Square.	Total No. of Observations.	No. in Nn. Half of Square.	No. in Sn. Half of Square.
N.En.	N.En.	—	—	—	—	—	—	—	—	—
"	S.En.	2	—	2	8	—	8	21	15	6
"	N.Wn.	—	—	—	3	2	1	7	—	7
"	N.	1	1	—	1	1	—	10	—	10
"	E.	—	—	—	—	—	—	6	3	3
"	W.	—	—	—	—	—	—	1	—	1
		3	1	2	12	3	9	46	18	28
S.En.	N.En.	1	—	1	9	5	4	29	12	17
"	S.En.	—	—	—	2	—	2	13	—	13
"	S.Wn.	—	—	—	4	—	4	—	—	—
"	N.Wn.	—	—	—	1	—	1	3	1	2
"	N.	—	—	—	3	3	—	19	11	8
"	E.	—	—	—	—	—	—	8	2	6
		1	—	1	19	8	11	72	26	46
S.Wn.	N.En.	—	—	—	1	—	1	7	6	1
"	S.En.	—	—	—	2	—	2	1	—	1
"	N.Wn.	—	—	—	1	—	1	—	—	—
"	N.	—	—	—	—	—	—	1	1	—
"	E.	—	—	—	—	—	—	1	—	1
		—	—	—	4	—	4	10	7	3
N.Wn.	S.En.	—	—	—	1	—	1	2	—	2
"	S.Wn.	—	—	—	2	—	2	—	—	—
		—	—	—	3	—	3	2	—	2

NOTE.—The following are the percentages of upper clouds from the various quarters, 130 being the total number of observations.

From the N.En. quarter 35% being + 2% since March.
" S.En. " 55 " " + 14 " "
" S.Wn. " 8 " " — 11 " "
" N.Wn. " 2 " " — 5 " "

The number of observations on the motion of upper clouds has decreased in both the Nn. and Sn. halves of the square, but most in the Sn.

In the Nn. half of the square the largest number of upper clouds was from the N.Ed., wind N.Ely.

In the Sn. half of the square the largest number of upper clouds was from the S.Ed., wind also N.Ely.

Table 8 and its note need no explanation. As in previous months most of the upper clouds from the S.Ed., wind N.Ely., were in the Sn. half of the square, whilst all but one of the upper clouds from the S.Wd., wind N.Ely., were in the Nn. half of the square.

The following remarks on Clouds seem worthy of extraction:—

Latitude.	Sub-square.	Remarks on Clouds. NOTE. A bar, thus —, separates the Remarks from different Logs.
7° to 8° N.	74	Clouds from E. by N. all day, wind N.N.E.
6° to 7° N.	62	Upper clouds from W., wind N.N.W.—Cir.-c. from E., wind N.N.E.
	63	Dark heavy clouds rising in the S. passing over to N., and killing the Nly. Trade.
5° to 6° N.	50	Cir.-s. from S., wind N. (2 entries).—Sky seems quite in commotion, atmosphere close.
	51	Clouds from N., wind W.N.W.—Cir.-c. from N., wind variable (3 entries).
	52	Cum. from N., wind E.S.E.—Upper clouds from S.W., lower from N.E., no wind.*
4° to 5° N.	40	Cir. from Sd., lower clouds from E.S.E., wind S.W. 2.—Cir.-s. from S.S.E., cum.-s. from Ed., str. from S.E. and S., wind N.
	41	Cir.-c. from Nd., no wind (3 entries).—Cir.-s. from Ed., wind N.N.W.
	45	Heavy cum. moving rapidly from the Ed., wind N.N.E. 2.—Cir. from W. very slowly, wind N. 3 to 4 (2 entries).
	49	Upper clouds from S.E., S., and S.W., wind N.N.E.
3° to 4° N.	31	Clouds from S. by E. and E. by N., wind variable.
	32	Cir.-c. from W.S.W., no wind.—Cir.-c. from N.N.E., no wind.
	33	Cum. from N.N.E., no wind.—Cum. from S.E. as if driven by a gale, wind N.
	34	Clouds from E. by N., no wind.
	35	Clouds from S.E. by E., no wind.
	37	Occasionally heavy dark clouds pass over, from which come smart showers; when this occurs the N.E. wind dies almost to a calm, and continues so for some little time after the cloud has passed and rain ceased, when the wind springs up again.
2° to 3° N.	21	Cir.-c. from E.S.E., no wind.
	23	Cum. from Ed. with light Sly. catspaws blowing under the cloud.
	24	Masses of dense cum. in horizon from E. to W. round by the N.—A number of white clouds like islands hanging along the horizon, an infallible sign of calms and light winds.
	25	Huge cum. to S.S.E., no wind.
1° to 2° N.	14	Clouds from S.E. by E., no wind.
	16	Cir.-s. from E. by S., no wind.—Cir.-c. from E., wind S.S.E.
	18	Heavy nim. packed on S.En. horizon, wind N.E.
0° to 1° N.	01	Cir. stationary, lower clouds from the Sd., wind S.E. 5.—Nim. from N.N.E., wind S.S.W.—Feathery cir., with stems to N.N.E., no wind.—Cir. from N.N.E., no wind, (3 entries).—Cir. from N.N.E., no wind (3 entries).
	07	Cir.-c. from N., no wind.

* No wind, means that it was calm.

WEATHER.

TABLE 9.—LATERAL STRIPS.

Lateral Strips, being 10° of Longitude by 1° of Latitude.				Thunder. (t.) %	Lightning. (l.) %	Squalls. (q.) %	Rain. (r.) %	Mist or Haze. (m.) %	Dew. (w.) %
9° to 10° N.	-	-	-	-	-	$\frac{3}{4}$	-	23	8
8° - 9° N.	-	-	-	-	2	-	-	24	$\frac{2}{3}$
7° - 8° N.	-	-	-	-	4	2	$\frac{2}{3}$	23	3
6° - 7° N.	-	-	-	2	5	1	1	27	2
5° - 6° N.	-	-	-	5	9	6	9	17	2
4° - 5° N.	-	-	-	7	14	10	19	12	$\frac{1}{4}$
3° - 4° N.	-	-	-	10	21	11	25	7	1
2° - 3° N.	-	-	-	5	13	12	23	5	-
1° - 2° N.	-	-	-	$\frac{3}{2}$	9	9	19	3	-
0° - 1° N.	-	-	-	2	8	8	17	4	$\frac{1}{2}$

TABLE 10.—VERTICAL STRIPS.

Vertical Strips, being 10° of Latitude by 1° of Longitude.				Thunder. (t.) %	Lightning. (l.) %	Squalls. (q.) %	Rain. (r.) %	Mist or Haze. (m.) %	Dew. (w.) %
20° to 21° W.	-	-	-	7	14	6	16	6	1
21° - 22° W.	-	-	-	7	13	8	20	8	-
22° - 23° W.	-	-	-	3	10	10	16	7	2
23° - 24° W.	-	-	-	4	12	8	13	12	2
24° - 25° W.	-	-	-	3	8	5	13	8	$\frac{1}{2}$
25° - 26° W.	-	-	-	6	13	10	22	11	1
26° - 27° W.	-	-	-	2	8	8	8	16	2
27° - 28° W.	-	-	-	$\frac{3}{2}$	8	8	12	26	3
28° - 29° W.	-	-	-	$\frac{3}{2}$	6	3	14	20	-
29° - 30° W.	-	-	-	-	$\frac{2}{3}$	9	8	22	3

TABLE 11.—LIGHTNING.

This Table gives the bearing on which Lightning was seen in the various Lateral Strips. Only the bearings recorded as actually N., S., E., or W. have been given to those points.

Lateral Strips, being 10° of Longitude by 1° of Latitude.				Number of Observations.	N.	N.Ely.	E.	S.Ely.	S.	S.Wly.	W.	N.Wly.	All round	No direction given.
9° to 10° N.	-	-	-	-	-	-	-	-	-	-	-	-	-	-
8° - 9° N.	-	-	-	3	-	-	-	1	1	-	-	-	-	-
7° - 8° N.	-	-	-	4	-	-	-	3	1	-	1	-	-	-
6° - 7° N.	-	-	-	7	-	-	-	4	3	-	-	-	-	-
5° - 6° N.	-	-	-	7	-	-	-	3	1	-	-	1	-	2
4° - 5° N.	-	-	-	17	-	1	-	8	2	1	-	1	2	2
3° - 4° N.	-	-	-	30	-	10	1	2	1	3	-	2	3	8
2° - 3° N.	-	-	-	22	3	3	7	1	1	1	-	2	1	3
1° - 2° N.	-	-	-	16	1	8	2	1	1	2	-	-	-	1
0° - 1° N.	-	-	-	12	2	3	1	2	1	-	-	2	1	-
Total for the month, and how distributed				118	6	25	11	25	12	7	1	8	7	16

By meaning the percentages in Table 9 it will be seen that there has been very little change in the mean amount of unsettled weather since March, still, by comparing the various strips, it is shown that lightning and rain have decidedly increased in amount between 3° and 5° N. Table 10 shows that thunder, lightning, and rain continue to be more abundant on the En. than on the Wn. side of the square.

The percentage of Mist has decreased in the Nn. half of the square, though it is still much more abundant there than in the Sn. Table 10 and the En. and Wn. strips of the Chart show that it is now much more abundant in the Wn. than in the En. half of the square: it is most abundant in its N.Wn. corner, where the N.E. wind is so much stronger than elsewhere.

Between 9° and 10° N. the percentage of Dew is 8, having increased 2 since March, the great difference of temperature in the Nn. part of the Square, as shown by the closeness of the isotherms, seems to account for the large percentage of Dew which exists there during February, March and April. The Chart shows that there is still most dew in the N.Wn. corner of the square.

Heavy squalls were experienced between the Equator and 7° N., on an average 1 in 11 was heavy; there were 7 very heavy squalls between 2° and 6° N., and chiefly between 22° and 27° W.; they are all alluded to and their sub-squares are given in the remarks of Table 3, which show that some of them did much damage. It will be remembered that in March there were only 2 very heavy squalls. April is the month which precedes the Nn. progress of the S.E., and retreat of the N.E. Trade: perhaps the heavy squalls may be related to this change.

Table 11 shows that lightning has been most frequently seen on some Sly. bearing between 4° and 9° N., and on some Nly. bearing between 0° and 4° N.; the transition from one to the other is very sharply defined, indicating that the chief source of the lightning was in about 4° N., where Table 9 shows there was also the most thunder, lightning and rain. The greatest increase of lightning and rain since March has also taken place between 3° and 4° N. It seems worthy of remark that since the beginning of the year there has been very much more lightning seen in Ely. than in Wly. directions.

The following remarks on Weather are considered worthy of extraction; they give the direction in which *certain kinds* of lightning were seen, &c., &c.

Latitude.	Sub-square.	Remarks on Weather.
		NOTE.—A bar, thus —, separates the Remarks from different Logs.
9° to 10° N.	96	Air damp, everything not exposed to the sun quite wet.—Sky beginning to have a watery appearance (ship going to Sd.).
8° - 9° N.	83	Haze clearing off a little.
	85	Sheet lightning in S.E.
7° - 8° N.	75	Thin haze about horizon.
	76	Sky overspread with a whitish haze.

Latitude.	Sub-square.	Remarks on Weather. NOTE. A bar, thus —, separates the Remarks from different Logs.
6° to 7° N.	60	Gloomy to the Sd.
	65	Lightning in S.S.E. to S.W.—A large ring round the moon.—Sheet l. in S.E.
5° - 6° N.	50	10 p.m. to 4 a.m. Exceedingly heavy l. and t., principally from S.Ed., travelling Wd. and N.Wd.—Gloomy to the Sd.
	51	Very hot and sultry (seven entries).
	52	Excessively close and sultry; horrid weather, and a most fearfully sickly sensation prevails over all the crew, heat so suffocating. Short showers, but drops as big as marbles.—Incessant rain.—Much heat l.
	53	Halo round the moon.
	54	Sheet l. on horizon.
	57	Most beautiful weather. (A great contrast to the remarks in s.-s. 52. The wind chart of 1° sub-squares shows a steady N.E. Trade, mean force 4.2 in s.-s. 57, whilst s.-s. 52 has much calm and a mean force of 2.3.)
4° - 5° N.	40	Lightning and thunder to the Sd. and Ed., twice as much l. as t.
	41	7 hours constant rain.
	43	High gray dawn.
	44	Halo round the moon.—Frequent sheet l. in S.E.
	45	Sheet l. in E.S.E.
	47	Haze enveloping the whole sky, a large ring round the moon.—Hazy over horizon.
	48	A very thin haze covering the blue sky.
	49	Sea and sky as seen through gauze.
3° - 4° N.	31	Sheet l. during the night, mostly to the Wd. and Nd.—Forked l. in W.S.W.—A small waterspout going to W.N.W.
	32	Torrents of rain with but little intermission from midnight to 2 a.m.—Halo round moon. Heavy l. in the N.E. and S.W.
	35	22nd, 1859. Several flashes like a ball came from a small black cloud to the Ed. of us: pretty clear all round.—Very close and disagreeable.—Forked l. all round and slight t.
	36	Sheet l. in S.W.—Thermometer has fluctuated a good deal during the day, the wind at times blowing in warm gusts.
	37	Dark smoky appearance.
	39	Mist on horizon.
2° - 3° N.	21	Sheet l. in all quarters.
	22	Sheet l. in the E.
	23	More white glare or haze, the whole sea and sky looking as seen through white gauze (ship going Nly).
	24	Forked l. and rolling t. in the N.E.
1° - 2° N.	10	Faint sheet l. from N.N.W. to N. E.
	11	Much sheet l. for 8 hours, principally to the Nd.—Throughout the day a very fine blue sky.
	15	Very fine weather (three entries).
	17	Very sultry in the night as well as day (two entries).
0° - 1° N.	00	Large halo round the moon.
	02	Incessant rain, and l. in every direction.
	03	Incessant r.

GENERAL REMARKS.

The following extracts have been made from the "Remarks" in various logs:

NATURAL HISTORY.

Latitude.	Sub-square.	Remarks on Natural History.
<i>Land Birds and Insects.</i>		
6° to 7° N.	60	A beautifully coloured <i>Butterfly</i> flew on board.
5° - 6° N.	59	A <i>Hawk</i> devouring a stormy petrel, plucking and eating it as it flew.
4° - 5° N.	44	A <i>Moth</i> flew on board.
3° - 4° N.	34	Two <i>Swallows</i> .
<i>Cetacea.</i>		
5° - 6° N.	50	Three <i>Whales</i> of a small species.
1° - 2° N.	10	Two small <i>Whales</i> .
3° - 4° N.	31	A few <i>Grampuses</i> .
1° - 2° N.	19	A great many <i>Grampuses</i> playing about.
1° - 2° N.	12	<i>Blackfish</i> .
0° - 1° N.	03	"
0° - 6° N.	-	<i>Porpoises</i> were seen in sub-squares 50,* 55, 35, 36, 23, 12, 17 (twice), 01, and 05. In s.-s. 17 they were twice seen coming from the Sd.
NOTE.—It seems worthy of remark that all the <i>Cetacea</i> seen in April were to the Sd. of 6° N., and chiefly on the En. side of the square, where the water was hottest and uniform in temperature. <i>Medusæ</i> , &c. were also very abundant there.		
<i>Fish, &c.</i>		
0° - 7° N.	-	<i>Albicore</i> s were seen in s.-ss. 65, 23, 24, 10, 12, 02,* 04.
0° - 10° N.	-	<i>Bonitos</i> " 92, 83, 68, 53, 58, 33, 33, 35, 38, 24, 10, 02, 04.
1° - 8° N.	-	<i>Dolphins</i> or <i>Coryphæna</i> " 71, 60, 58, 14.
0° - 10° N.	-	<i>Flying Fish</i> " 34 times in 28 sub-squares, 16 times in the Nn. and 18 in the Sn. half. They were abundant in s.-ss. 90, 92, 83, 85, 88, 71, 56, 57, 58, 33, and very abundant in s.-ss. 01, 02, 04.
3° - 7° N.	-	<i>Skipjacks</i> " 65, 33, 38.
0° - 2° N.	-	<i>Sharks</i> " 14, 19, 00, 02. In s.-s. 02, a shark 4 ft. long was caught.
0° - 10° N.	-	<i>Portuguese-men-of-war</i> were seen in s.-ss. 92, 71, 50, 43, 44, 46, 48, 10, 11, 12, 03; they were large in s.-ss. 44, 46, 48, and 10.
1° - 7° N.	-	<i>Medusæ</i> were seen in s.-ss. 62, 50, 45, 21, 10, and 13.
<i>Remarks.</i>		
5° - 6° N.	50	Numerous small reddish <i>Medusæ</i> lying in clusters together. The isotherms show that the hottest water was there.
2° - 3° N.	21	Numerous <i>Medusæ</i> of a red colour and about an inch in diameter.
	24	Vast numbers of well-developed <i>Acalephæ radiata</i> (jelly fish).

* One dot indicates that the creatures were abundant; two that they were very abundant, &c.

Latitude.	Sub-square.	Remarks on Natural History.
1° - 2° N.	10	Water full of mushroom-shaped <i>Medusæ</i> , and great shoals of <i>Squid</i> .
	13	Large quantities of small <i>Medusæ</i> from 1 to 3 inches. (NOTE.—The first figures in the numbers of the sub-squares, which indicate the latitude, show that most of the fish and their food were met with in the Sn. half of the square, where the warm current from the Sn. latitudes was running.)
0° - 10° N.	- -	<i>Sea Birds.</i> <i>Stormy Petrels</i> were seen in s.-ss. 96, 71, 66,* 66, 50, 52, 57, 45, 35, 37, 21, 22, 24, 12, 12, 12, 00, 03. The numbers of the sub-squares show that they were still more frequent in the Sn. than in the Nn. part of the square.
0° - 7° N.	- -	<i>Birds</i> (supposed to have been sea birds) were seen in s.-ss. 60, 63, 47, 33, 34, 21, 23, 12, 01. They, too, were much more frequent in the Sn. than in the Nn. half of the square.

FALLING STARS.

There are 11 entries of Falling Stars, distributed over seven years between 1855 and 1871 inclusive: of these four were in 1855, and two in 1862, leaving only one for each of the other five years. The following remarks may be interesting.

Sub-Square.	Hour.	Day.	Year.	Remarks on Falling Stars.
58	10 p.m.	7th	1856	Many meteors and occasional flashes of l.
31	2 a.m.	17th	1862	A very bright meteor falling to the Ed.; it burst about 15° above the horizon with a bright blue and red flame.
12	2 a.m.	19th	1868	Many meteors, some very bright.
00	Midt.	29th	1871	A large meteor burst near the ship, of great size and splendour.

* One dot indicates that the creatures were abundant; two that they were very abundant, &c.

TEMPERATURE OF RAIN AND AIR.

Sub-Square.	Temperature of Rain.	Temperature of Air.
55	75° 0	77° 8
44	76° 0	80° 4
32	74° 6	83° 2
33	75° 9	78° 7
34	75° 0	75° 0
23	76° 0	75° 5
23	76° 0	77° 0
24	76° 5	76° 5
13	76° 0	76° 0
13	76° 0	75° 0
14	75° 0	79° 0
15	76° 5	81° 0
03	74° 5	77° 8
03	75° 0	74° 0
04	73° 6	76° 7
15) 81° 6		15) 113° 6
75° 4		77° 6 Difference 2° 2

The mean temperature of both rain and air has increased since March, and the difference has increased 0° 5.

Sub-square.	VARIOUS.
70	A quantity of fine red sand or powder adhering to the skysail and rigging which has been expected for some days past on account of the great quantity of haze: wind Nly., Ship from the Nd.
79	The "lays" of the standing and running rigging filled with an impalpable reddish-brown powder: wind N.Ely., Ship from the Sd.
66	8 a.m. 11th, 1856. Dip by Fox's circle, 27° 48'.
45	The surface of the sea covered with a brownish dust, the specks being from $\frac{1}{20}$ to $\frac{1}{30}$ of an inch long.
30	Much fish spawn in the last 24 hours. (Seamen call most matter floating on the water fish spawn.)
11	Water very dirty with substance like blanket hairs; when looked at through a microscope it appeared like fine seaweed covered with coral excrescences: also a kind of minute bur, which when magnified was star-shaped, the radii being extremely fine.

BEST ROUTES FOR CROSSING THE EQUATOR.

Appendix B shows that between 18° and 20° N., and again between 10° and 12° N. the mean force of all winds is greater on the Wn. than on the En. side of Square 39; whilst between 14° and 16° N. (abreast of the Cape Verds) it is decidedly greater in the En. half of the zone. But the chief difference between the two sides of the square is in *direction*, for in the Wn. half there is an average of 6% of S.Ely. winds against less than 1% in the En. half, whilst in the En. half there is an average of 10% of N.Wly. winds against 1% in the Wn. half: the S.Ely. winds in the Wn. half were most frequent between 14° and 16° N. (abreast of the Cape Verd Islands), whilst the N.Wly. winds in the En. half were most frequent between 10° and 16° N. (to the Sd. and abreast of the Cape Verd Islands), the percentage amounting to 19 between 10° and 12° N. The published Chart and Table 2 for April show that there is also a large amount of N.Wly. wind on the En. side of Square 3.

The following Table may be usefully consulted with the April Table of Appendix B. for it shows the three points of each quarter of the compass from which the wind prevails in each half of the square. It proves that the N.Ely. wind of the Wn. half of Square 39 is much more Ely. than that of the En. half; also that the S.Ely. winds are chiefly East, and seldom to the Sd. of E. by S., and that the N.Wly. winds are generally N. by W., and scarcely ever to the Wd. of N.W.

TABLE 12.

The Direction of the three Prevailing Winds of each quarter of the compass, in each half of Square 39. They are in the order of their prevalence. A dash under a letter or figure indicates extreme prevalence.

Latitude.	N. to E. b. N., or N.Ely. Winds.		E. to S. b. E., or S.Ely. Winds.		S. to W. b. S., or S.Wly. Winds.		W. to N. b. W., or N.Wly. Winds.	
	Wn. half. 25° to 30° W.	En. half. 20° to 25° W.	Wn. half. 25° to 30° W.	En. half. 20° to 25° W.	Wn. half. 25° to 30° W.	En. half. 20° to 25° W.	Wn. half. 25° to 30° W.	En. half. 20° to 25° W.
	Points from North.	Points from North.	Points from South.	Points from South.	Points from South.	Points from South.	Points from North.	Points from North.
18° to 20° N.	6, 3, 4	2, 4, 3	8, 7, -	8 - -	- - -	3, - -	1, - -	2, 8, -
16° - 18° N.	4, 3, 2	2, 1, N.	8, 7, -	- - -	S., - -	6, - -	- - -	1, - -
14° - 16° N.	5, 3, 4	2, N., 1	8, 6, 7	- - -	S., - -	- - -	1, - -	1, 2, 4
12° - 14° N.	3, 4, 2	N., 2, 1	8, 5, -	- - -	S., - -	- - -	1, - -	1, 2, 4
10° - 12° N.	4, 3, 2	N., 1, 4	8, 4, 7	8 - -	- - -	- - -	1, - -	1, 2, 3

The accompanying Chart for April, and the prevailing wind-arrows on the Diagram in its lower right-hand corner show that from 2° to 10° N. the prevailing winds are Nly.,

drawing more Ely. and stronger as you pass from the En. to the Wn. side of the square. (Before consulting the Chart it may be well to read the paragraph on the lower part of p. 9, which precedes the Remarks for January.) The Chart and Diagram also show that from 0° and 2° N. the prevailing wind is S.Ely., except in the 2° square to the Wd. of 28° W., where it is N.Ely. Table 2 shows that the S.Ely. wind is slightly stronger on the Wn. than on the En. side of the square. The red sections of the Chart and its Diagram show that there are pretty strong Wly. currents between 0° and 4° N., with lighter Wly. *prevailing* in the rest of the square, but the red arrows on the Diagram show several Ely. currents on the En. side of the square. Table 5 shows that Ely. currents prevail between 20° and 23° W.

Appendix C shows that in April the prevailing winds of Square 303 are more Sly. between 30° and 33° W. than between 33° and 35° W.; this is well shown by drawing pencil lines down the En. and Wn. parts, making them pass through the largest percentage for each degree of latitude. The mean direction of the *prevailing* winds for each degree of latitude is E. ½ S. in the Wn., and S.E. by E. in the En. part. The mean force of the *prevailing* winds in the Wn. part is 3.0, whilst in the En. it is 3.9. The mean of the mean forces of *all* winds is 3.1 in the Wn., and 3.5 in the En. part. (See the note to Beaufort's scale on the upper right-hand corner of the Chart for the value of those forces in speed per hour of Beaufort's ship.) The lightest winds are in 3° to 5° S. In spite of the fact that the stronger winds are in the En. part there is 20 % of calm there between 4° and 6° S.; in the same part there is 18 % of variables between 0° and 1° S. having a mean force of only 1.6.

The above facts show that the *Outward-bound* ship should pass to the Wd. of the Cape Verd Islands, and through the Wn. half of Square 3, keeping as much to the Ed. as possible after getting the S.E. Trade, because in Square 303 it is stronger between 30° and 33° W. than between 33° and 35° W.; but keeping clean full, and not fearing to close with Cape St. Roque if driven there, as the prevailing wind is N.Ely. between 0° and 5° S. in 33° to 35° W.

The ship "Oracle," Captain A. D. Wood, crossed the Equator in 30° 24' W. at 9 p.m. of April 5th. On the 6th, noon, she was in 1° 47' S., 31° 33' W.; 7th, 4° 28' S., 33° 6' W.; 8th, 6° 38' S., 34° 9' W.; 9th, 7° 42' S., 34° 2' W., having stood to the Ed. for 12 hours with the wind S.E. by E.; 10th, 9° 47' S., 34° 56' W. He remarks at 2 a.m., "Very light Trade, too close in shore." She had no N.Ely. wind.

The *Homeward-bound* ship should keep to the Ed. of 33° W., so as to avoid the light N.Ely. winds which are common near Cape St. Roque, and she should not cross the Equator to the Ed. of 25° or 26° W., by which means she will avoid the light N.Wly. winds which are so common on the En. side of Square 3.

MAY.

Barometer.—The isobars (see the lower right-hand corner of the Chart) show that the highest pressure is still in the Nn. part of the square, whilst the lowest is in its S.Wn. corner.

The highest mean pressure in the lateral strips (29·997) is still between 9° and 10° N., whilst the lowest (29·945) is between 1° and 2° N. Pressure has increased, generally since April, the greatest increase (·029) being between 9° and 10° N., and the least (·013) between 1° and 2° N. On considering the increase in the sub-squares, it is found to have been very great in s.-ss. 00 and 01, where there has been a great decrease in the temperature of both air and sea. It will be seen that the isobar of 29·98 just shows in the S.En. corner of the square, which is no doubt related to the increased percentage and force of the S.E. Trade in this part, which will be mentioned hereafter.

The mean of the means in the lateral strips (29·964) indicates that the Mean Pressure of the square has increased ·019 since April. The means in the vertical strips compared with those for April show that the pressure has *increased* twice as much in the En. as in the Wn. half, and the temperature of both air and sea has *decreased* on the En. side, whilst that of the sea has *increased* on the Wn. side. This relation between changes of pressure and temperature seems very common.

Air Temperature.—The air isotherms compared with those for April show an increase of temperature in the N. and decrease in the S., the lateral strips have an increase of 1·4 between 9° and 10° N. whilst there is a decrease of 0·7 between 0° and 1° N. The Mean for the whole square (79°·3) shows no change since April, but it is manifest that its Nn. part is beginning to feel the influence of the Nn. summer, whilst the Sn. part is experiencing the decreased temperature, increased pressure, and freshening Sly. wind due to the Sn. winter.

Dry and Damp Bulbs.—The least difference between dry and damp bulbs (3°·0) lies between 4° and 5° N., where there is the largest percentage of rain, and the lowest mean force of wind. The difference increases to 3°·9 between 8° and 10° N. and to 3°·7 between 1° and 2° N. The vertical strips show that the En. is hotter and damper than the Wn. half. The mean of the whole square (3°·5) shows a decrease of 0°·2 since April.

Sea Temperature.—The isotherms of sea temperature still agree remarkably with those of the air, and keep about 1° higher. From 4° to 10° N. there has been a slight increase in the temperature of the sea, amounting to 0°·6 between 9° and 10° N. From 0° to 4° N. it has decreased, the decrease amounting to 0°·9 between 0° and 1° N. In

the most S.En. sub-square (00), both air and sea have decreased about 2°·7 since April, indicating how the decrease is due to the Nn. progress of the S.E. Trade. The Mean Surface Temperature of the whole square (80°·4) has scarcely changed, this is owing to the balance between the increase in the N. and decrease in the S. The red isotherm and current arrows show best how the hottest sea and easterly current are on the En. side of the square.

Specific Gravity.—The lowest specific gravity (1·0264) lies between 4° and 5° N. where there is the most rain, least wind, and largest percentage of Ely. current, it increases to 1·0271 between 8° and 10° N. and to 1·0269 between 0° and 2° N. The Mean for the square (1·0268) shows a very slight decrease since April; a comparison of the lateral strips shows that the decrease is confined to the zone between 3° and 7° N. where there has been a great increase in the percentage of rain since April. The vertical strips indicate that the specific gravity is very slightly greater in the Wn. than in the En. half of the square.

WIND.

TABLE 1.—LATERAL STRIPS.

Lateral Strips. 10° of Longitude by 1° of Latitude.	No. of Observa- tions.	Mean Force of Strip.	N. to E. by N. or N.E.v.		E. to S. by E. or S.E.v.		S. to W. by S. or S.W.v.		W. to N. by W. or N.W.v.		Variables.		Calms.	Prevailing Wind.		Strongest Wind.*	
			%	Mean Force.	%	Mean Force.	%	Mean Force.	%	Mean Force.	%	Mean Force.	%	No. of Observations. Direction.	Mean Force.	No. of Observations. Direction.	Mean Force.
9° to 10° N.-	157	3·9	87	4·0	4	4·2	—	—	7	2·7	1	4·0	1	N.E. ⁴³ by N.	4·3	E. ⁴	4·6
8° - 9° N.-	220	3·6	85	3·8	4	3·6	1	2·0	9	2·9	—	—	1	N.E. ⁵⁸ by N.	3·7	N.E. ²⁶ by E.	4·1
7° - 8° N.-	284	3·2	76	3·5	3	3·0	3	2·3	12	2·6	3	2·3	3	N.E. ⁴⁵ by N.	3·8	N.E. ²⁷ by E.	3·9
6° - 7° N.-	304	2·9	64	3·3	10	3·0	3	2·1	14	2·5	5	2·4	4	N.E. ⁴⁴ by N.	3·6	N.E. ²⁴	3·8
5° - 6° N.-	337	2·6	52	3·2	14	2·8	5	2·5	12	2·2	9	1·8	8	N.E. ³² by N.	3·6	S.E. ³	4·0
4° - 5° N.-	405	2·0	37	2·7	20	2·4	11	2·2	7	2·6	8	1·6	17	N.E. ²⁶ by N.	2·6	W.N.W. ²	4·8
3° - 4° N.-	411	2·1	21	2·5	36	2·7	15	2·4	5	1·8	10	1·8	13	S.E. ³⁵ by E.	2·5	E.S.E. ¹⁶	3·6
2° - 3° N.-	342	2·5	11	2·8	52	3·0	13	2·5	4	1·9	13	1·9	7	S.E. ⁴⁶ by S.	3·4	N.E. ²	3·5
1° - 2° N.-	322	2·8	8	2·6	63	3·3	14	2·4	5	2·1	5	2·1	5	S.E. ³⁸ by S.	3·7	E.N.E. ⁵	4·0
0° - 1° N.-	300	2·9	6	2·5	74	3·3	10	2·4	1	1·0	3	2·1	6	S.E. ⁵⁴	3·4	S.E. ³² by S.	3·7

* In recording the Strongest Wind in a Strip, weight has been given to the number of observations; otherwise the direction and force of a single squall would frequently appear in this column.

TABLE 2.—VERTICAL STRIPS.

Vertical Strips. 10° of Latitude by 1° of Longitude.	No. of Observa- tions.	Mean Force of Strip.	N. to E. by N. or N.E.v.		E. to S. by E. or S.E.v.		S. to W. by S. or S.W.v.		W. to N. by W. or N.W.v.		Variables.		Calms.	Prevailing Winds.		Strongest Wind.*	
			%	Mean Force.	%	Mean Force.	%	Mean Force.	%	Mean Force.	%	Mean Force.		No. of Observations. Direction.	Mean Force.	No. of Observations. Direction.	Mean Force.
20° to 21° W.	228	2.3	27	2.7	20	3.1	15	2.1	22	2.5	5	1.8	11	N.N.W. ¹⁹	2.4	S.E. ¹²	3.9
21° - 22° W.	288	2.4	28	2.7	20	3.0	14	2.4	17	2.7	12	1.9	9	N. ²¹	2.4	W.N.W. ²	4.8
22° - 23° W.	318	2.4	28	3.0	31	3.2	10	2.1	12	1.7	8	1.8	11	S.E. ²⁰	2.9	E. ⁹	3.9
23° - 24° W.	358	2.6	32	3.1	36	3.0	15	2.5	5	1.9	4	1.6	8	E.S.E. ²⁰	3.3	N.E. by E. ¹⁶	3.7
24° - 25° W.	445	2.6	44	3.0	30	3.0	7	2.4	5	2.5	5	1.9	9	N.E. by N. ³⁶	2.7	N.E. by E. ²⁷	3.4
25° - 26° W.	403	2.8	44	3.3	30	3.0	7	2.9	5	2.6	5	1.9	9	N.E. by N. ³⁸	3.5	S.W. by S. ²	4.5
26° - 27° W.	304	3.1	55	3.7	24	3.1	4	2.7	6	2.3	6	1.7	5	N.E. by N. ⁴⁶	4.2	N.E. by N. ⁴⁶	4.2
27° - 28° W.	282	3.1	47	3.5	33	3.2	6	2.0	2	2.2	8	2.4	4	N.E. by N. ⁴⁵	3.9	S. by E. ⁴	4.0
28° - 29° W.	210	3.2	49	3.6	36	3.0	7	2.6	1	3.8	5	2.0	2	N.E. by N. ²⁷	4.0	N.E. by N. ²⁷	4.0
29° - 30° W.	246	3.0	42	3.8	43	3.8	3	1.9	1	2.5	7	1.7	4	N.E. by N. ²⁶	4.1	N.E. by N. ²⁶	4.1

By comparing the means of the percentages in the *lateral* strips (Table 1) with those for April, we get the following result for the whole square.

N.Ely. wind 45 % and decreased 14 % since April.
 S.Ely. " 28 " and increased 14 " "
 S.Wly. " 7 " " 3 " "
 N.Wly. " 8 " and decreased 3 " "
 Variables 6 " and increased 1 " "
 Calms 6 " and decreased 1 " "

The Mean Force for the square (2.9) shows very little change since April, but by comparing the forces of the various winds in the strips, it is shown that the force of N.Ely. winds has very decidedly decreased between 3° and 8° N., whilst that of S.Ely. winds has increased between 0° and 4° N. The percentage of calms has much increased between 4° and 8° N., whilst it has decreased very much between 0° and 3° N.

The prevailing wind arrows on the small Diagram show that the N.E. Trade is still weaker and more Nly. on the En. than on the Wn. side of the square, whilst they show that the S.E. Trade is very uniform in direction. The percentage of N.Wly. winds is still very great on the En. side of the square, see Table 2, and especially the vertical strips at the bottom of the published Chart, which show graphically how frequent they are between 20° and 22° W., decreasing in number as you pass to the Wd. S.Wly. winds are also much more common on the En. than on the Wn. side of the square.

* In recording the Strongest Wind in a Strip, weight has been given to the number of observations; otherwise the direction and force of a single squall would frequently appear in this column.

TABLE 3.

Latitude.	s.-s.	Winds, Force 7 or upwards, but not Squalls.	Direction of Squalls and Heavy Squalls. (All Squalls Force 7 or upwards are considered to be heavy.) (All Squalls on either side of N., S., E., or W., are given to their re- spective quarters, so that there are fewer from the above-named points than from the quarters.)								s.-s.	REMARKS. NOTE.—A bar, thus —, separates the Remarks from different Logs. The dates of Trade limits are in the order of the sub-squares, in which they occurred, beginning with the most Eastern one.
			N.	N.E.	E.	S.E.	S.	S.W.	W.	N.W.		
			Heavy.	Heavy.	Heavy.	Heavy.	Heavy.	Heavy.	Heavy.	Heavy.		
9° to 10° N.	—	- - -	- - 2	- - -	- - -	- - -	- - 1	- - -	95 94 95 97 74 & 76 73 75 60-62 62 66 54 50 52 55 56 57 43-49 44 33 & 37 35 & 38 30 34 35 37 27 & 29 23-29 20 21 22 26 27 14 12 18 19 02 & 05	Sn. limit of N.E. Trade, 29th. Sudden shift of wind to S.W., with furious squalls and heavy rain. 25th, unsteady S.Ely. wind (3 entries). —Wind in slight variable puffs from the Ed. N.N.E. breeze coming in sudden gusts. Sn. limit of N.E. Trade, 29th, 6th. Wind very variable between E.S.E. and S.S.E. 27th, very violent squall from the Sd., with vivid forked l. in the N.Wd. Sn. limit of N.E. Trade, 18th, 5th, 27th. Heavy squalls from N. to S.S.E., force 7, with t. l. r. 18th, wind shifted suddenly from N.E. to S. Sn. limit of N.E. Trade, 17th. Squall between N.N.E. and S.S.E. A very severe squall from the Ed. Wind in squall S.Ely, force 9 (2 entries). N.N.E. squall, force 7, for three hours. N. b. W. squall, force 7, for one hour. N.Ely. squall, force 8. Sn. limit of N.E. Trade, 23rd, 1st, 17th, 9th, 15th, 21st, 17th. Wind shifting from S.E. b. E. to W. b. S. in the squall.—Wind from all directions in slight squalls of a few minutes' duration. Sn. limit of N.E. Trade, 12th, 13th, 15th. Sn. limit of S.E. Trade, 28th, 14th. Sudden and heavy but short squall from Ed. A N.Wly. squall for three hours, but wind backed to the Sd.—13th, N.E. Trade ended in a squall from the Sd.—Arched squalls rising from all quarters with no wind.—Wind suddenly shifted from S. b. E. to the Nd. Got a warm dry S.E. wind, thermometer rose at once from 75° to 79°.—Fierce S.Ely. gusts, nearly calm between them. Lost N.E. Trade suddenly in a shower. Sn. limit of N.E. Trade, 17th and 7th. Sn. limit of S.E. Trade, 26th, 16th, 14th, 28th, 17th, 18th. Continual squalls, wind flying nearly round the compass. Wind in light puffs of 15 or 20 minutes' duration. Constant succession of violent squalls. Fierce gusts of wind from S.E., with almost calm between. Passed from S.E. to N.E. Trade without a calm. Sn. limit of N.E. Trade, 17th. Sn. limit of S.E. Trade, 17th. Passed from one Trade to the other without a calm. Puffs of wind in squalls get heavier, ship from the Nd. Light variable wind from S.W. b. S. to S.E. b. S. Squalls generally from E. b. N.—The S.S.E. wind veering greatly with slight squalls. Sn. limit of S.E. Trade, 14th.		
7° - 8° N.	74	N. b. E. 7	- - 2	- - -	- - -	- - -	- - 1	- - -	74 & 76 73 75 60-62 62 66 54 50 52 55 56 57 43-49 44 33 & 37 35 & 38 30 34 35 37 27 & 29 23-29 20 21 22 26 27 14 12 18 19 02 & 05	Sn. limit of N.E. Trade, 29th. Sudden shift of wind to S.W., with furious squalls and heavy rain. 25th, unsteady S.Ely. wind (3 entries). —Wind in slight variable puffs from the Ed. N.N.E. breeze coming in sudden gusts. Sn. limit of N.E. Trade, 29th, 6th. Wind very variable between E.S.E. and S.S.E. 27th, very violent squall from the Sd., with vivid forked l. in the N.Wd. Sn. limit of N.E. Trade, 18th, 5th, 27th. Heavy squalls from N. to S.S.E., force 7, with t. l. r. 18th, wind shifted suddenly from N.E. to S. Sn. limit of N.E. Trade, 17th. Squall between N.N.E. and S.S.E. A very severe squall from the Ed. Wind in squall S.Ely, force 9 (2 entries). N.N.E. squall, force 7, for three hours. N. b. W. squall, force 7, for one hour. N.Ely. squall, force 8. Sn. limit of N.E. Trade, 23rd, 1st, 17th, 9th, 15th, 21st, 17th. Wind shifting from S.E. b. E. to W. b. S. in the squall.—Wind from all directions in slight squalls of a few minutes' duration. Sn. limit of N.E. Trade, 12th, 13th, 15th. Sn. limit of S.E. Trade, 28th, 14th. Sudden and heavy but short squall from Ed. A N.Wly. squall for three hours, but wind backed to the Sd.—13th, N.E. Trade ended in a squall from the Sd.—Arched squalls rising from all quarters with no wind.—Wind suddenly shifted from S. b. E. to the Nd. Got a warm dry S.E. wind, thermometer rose at once from 75° to 79°.—Fierce S.Ely. gusts, nearly calm between them. Lost N.E. Trade suddenly in a shower. Sn. limit of N.E. Trade, 17th and 7th. Sn. limit of S.E. Trade, 26th, 16th, 14th, 28th, 17th, 18th. Continual squalls, wind flying nearly round the compass. Wind in light puffs of 15 or 20 minutes' duration. Constant succession of violent squalls. Fierce gusts of wind from S.E., with almost calm between. Passed from S.E. to N.E. Trade without a calm. Sn. limit of N.E. Trade, 17th. Sn. limit of S.E. Trade, 17th. Passed from one Trade to the other without a calm. Puffs of wind in squalls get heavier, ship from the Nd. Light variable wind from S.W. b. S. to S.E. b. S. Squalls generally from E. b. N.—The S.S.E. wind veering greatly with slight squalls. Sn. limit of S.E. Trade, 14th.		
6° - 7° N.	- - -	1 - 1 1	- - -	- - -	- - -	- - -	- - -	- - -	60-62 62 66 54 50 52 55 56 57 43-49 44 33 & 37 35 & 38 30 34 35 37 27 & 29 23-29 20 21 22 26 27 14 12 18 19 02 & 05	Sn. limit of N.E. Trade, 29th. Sudden shift of wind to S.W., with furious squalls and heavy rain. 25th, unsteady S.Ely. wind (3 entries). —Wind in slight variable puffs from the Ed. N.N.E. breeze coming in sudden gusts. Sn. limit of N.E. Trade, 29th, 6th. Wind very variable between E.S.E. and S.S.E. 27th, very violent squall from the Sd., with vivid forked l. in the N.Wd. Sn. limit of N.E. Trade, 18th, 5th, 27th. Heavy squalls from N. to S.S.E., force 7, with t. l. r. 18th, wind shifted suddenly from N.E. to S. Sn. limit of N.E. Trade, 17th. Squall between N.N.E. and S.S.E. A very severe squall from the Ed. Wind in squall S.Ely, force 9 (2 entries). N.N.E. squall, force 7, for three hours. N. b. W. squall, force 7, for one hour. N.Ely. squall, force 8. Sn. limit of N.E. Trade, 23rd, 1st, 17th, 9th, 15th, 21st, 17th. Wind shifting from S.E. b. E. to W. b. S. in the squall.—Wind from all directions in slight squalls of a few minutes' duration. Sn. limit of N.E. Trade, 12th, 13th, 15th. Sn. limit of S.E. Trade, 28th, 14th. Sudden and heavy but short squall from Ed. A N.Wly. squall for three hours, but wind backed to the Sd.—13th, N.E. Trade ended in a squall from the Sd.—Arched squalls rising from all quarters with no wind.—Wind suddenly shifted from S. b. E. to the Nd. Got a warm dry S.E. wind, thermometer rose at once from 75° to 79°.—Fierce S.Ely. gusts, nearly calm between them. Lost N.E. Trade suddenly in a shower. Sn. limit of N.E. Trade, 17th and 7th. Sn. limit of S.E. Trade, 26th, 16th, 14th, 28th, 17th, 18th. Continual squalls, wind flying nearly round the compass. Wind in light puffs of 15 or 20 minutes' duration. Constant succession of violent squalls. Fierce gusts of wind from S.E., with almost calm between. Passed from S.E. to N.E. Trade without a calm. Sn. limit of N.E. Trade, 17th. Sn. limit of S.E. Trade, 17th. Passed from one Trade to the other without a calm. Puffs of wind in squalls get heavier, ship from the Nd. Light variable wind from S.W. b. S. to S.E. b. S. Squalls generally from E. b. N.—The S.S.E. wind veering greatly with slight squalls. Sn. limit of S.E. Trade, 14th.		
5° - 6° N.	- - -	- - 2 2	- 1 1	- - -	- - -	- - -	- - 1	- - -	60-62 62 66 54 50 52 55 56 57 43-49 44 33 & 37 35 & 38 30 34 35 37 27 & 29 23-29 20 21 22 26 27 14 12 18 19 02 & 05	Sn. limit of N.E. Trade, 29th. Sudden shift of wind to S.W., with furious squalls and heavy rain. 25th, unsteady S.Ely. wind (3 entries). —Wind in slight variable puffs from the Ed. N.N.E. breeze coming in sudden gusts. Sn. limit of N.E. Trade, 29th, 6th. Wind very variable between E.S.E. and S.S.E. 27th, very violent squall from the Sd., with vivid forked l. in the N.Wd. Sn. limit of N.E. Trade, 18th, 5th, 27th. Heavy squalls from N. to S.S.E., force 7, with t. l. r. 18th, wind shifted suddenly from N.E. to S. Sn. limit of N.E. Trade, 17th. Squall between N.N.E. and S.S.E. A very severe squall from the Ed. Wind in squall S.Ely, force 9 (2 entries). N.N.E. squall, force 7, for three hours. N. b. W. squall, force 7, for one hour. N.Ely. squall, force 8. Sn. limit of N.E. Trade, 23rd, 1st, 17th, 9th, 15th, 21st, 17th. Wind shifting from S.E. b. E. to W. b. S. in the squall.—Wind from all directions in slight squalls of a few minutes' duration. Sn. limit of N.E. Trade, 12th, 13th, 15th. Sn. limit of S.E. Trade, 28th, 14th. Sudden and heavy but short squall from Ed. A N.Wly. squall for three hours, but wind backed to the Sd.—13th, N.E. Trade ended in a squall from the Sd.—Arched squalls rising from all quarters with no wind.—Wind suddenly shifted from S. b. E. to the Nd. Got a warm dry S.E. wind, thermometer rose at once from 75° to 79°.—Fierce S.Ely. gusts, nearly calm between them. Lost N.E. Trade suddenly in a shower. Sn. limit of N.E. Trade, 17th and 7th. Sn. limit of S.E. Trade, 26th, 16th, 14th, 28th, 17th, 18th. Continual squalls, wind flying nearly round the compass. Wind in light puffs of 15 or 20 minutes' duration. Constant succession of violent squalls. Fierce gusts of wind from S.E., with almost calm between. Passed from S.E. to N.E. Trade without a calm. Sn. limit of N.E. Trade, 17th. Sn. limit of S.E. Trade, 17th. Passed from one Trade to the other without a calm. Puffs of wind in squalls get heavier, ship from the Nd. Light variable wind from S.W. b. S. to S.E. b. S. Squalls generally from E. b. N.—The S.S.E. wind veering greatly with slight squalls. Sn. limit of S.E. Trade, 14th.		
4° - 5° N.	43	S.S.E. 7	- - 1 1	- - -	- - -	- - -	- - 1	- - -	43-49 44 33 & 37 35 & 38 30 34 35 37 27 & 29 23-29 20 21 22 26 27 14 12 18 19 02 & 05	Sn. limit of N.E. Trade, 29th. Sudden shift of wind to S.W., with furious squalls and heavy rain. 25th, unsteady S.Ely. wind (3 entries). —Wind in slight variable puffs from the Ed. N.N.E. breeze coming in sudden gusts. Sn. limit of N.E. Trade, 29th, 6th. Wind very variable between E.S.E. and S.S.E. 27th, very violent squall from the Sd., with vivid forked l. in the N.Wd. Sn. limit of N.E. Trade, 18th, 5th, 27th. Heavy squalls from N. to S.S.E., force 7, with t. l. r. 18th, wind shifted suddenly from N.E. to S. Sn. limit of N.E. Trade, 17th. Squall between N.N.E. and S.S.E. A very severe squall from the Ed. Wind in squall S.Ely, force 9 (2 entries). N.N.E. squall, force 7, for three hours. N. b. W. squall, force 7, for one hour. N.Ely. squall, force 8. Sn. limit of N.E. Trade, 23rd, 1st, 17th, 9th, 15th, 21st, 17th. Wind shifting from S.E. b. E. to W. b. S. in the squall.—Wind from all directions in slight squalls of a few minutes' duration. Sn. limit of N.E. Trade, 12th, 13th, 15th. Sn. limit of S.E. Trade, 28th, 14th. Sudden and heavy but short squall from Ed. A N.Wly. squall for three hours, but wind backed to the Sd.—13th, N.E. Trade ended in a squall from the Sd.—Arched squalls rising from all quarters with no wind.—Wind suddenly shifted from S. b. E. to the Nd. Got a warm dry S.E. wind, thermometer rose at once from 75° to 79°.—Fierce S.Ely. gusts, nearly calm between them. Lost N.E. Trade suddenly in a shower. Sn. limit of N.E. Trade, 17th and 7th. Sn. limit of S.E. Trade, 26th, 16th, 14th, 28th, 17th, 18th. Continual squalls, wind flying nearly round the compass. Wind in light puffs of 15 or 20 minutes' duration. Constant succession of violent squalls. Fierce gusts of wind from S.E., with almost calm between. Passed from S.E. to N.E. Trade without a calm. Sn. limit of N.E. Trade, 17th. Sn. limit of S.E. Trade, 17th. Passed from one Trade to the other without a calm. Puffs of wind in squalls get heavier, ship from the Nd. Light variable wind from S.W. b. S. to S.E. b. S. Squalls generally from E. b. N.—The S.S.E. wind veering greatly with slight squalls. Sn. limit of S.E. Trade, 14th.		
3° - 4° N.	- - -	- - 1 -	- - 1 1	- - -	- - -	- - -	- - -	- - 2	33 & 37 35 & 38 30 34 35 37 27 & 29 23-29 20 21 22 26 27 14 12 18 19 02 & 05	Sn. limit of N.E. Trade, 29th. Sudden shift of wind to S.W., with furious squalls and heavy rain. 25th, unsteady S.Ely. wind (3 entries). —Wind in slight variable puffs from the Ed. N.N.E. breeze coming in sudden gusts. Sn. limit of N.E. Trade, 29th, 6th. Wind very variable between E.S.E. and S.S.E. 27th, very violent squall from the Sd., with vivid forked l. in the N.Wd. Sn. limit of N.E. Trade, 18th, 5th, 27th. Heavy squalls from N. to S.S.E., force 7, with t. l. r. 18th, wind shifted suddenly from N.E. to S. Sn. limit of N.E. Trade, 17th. Squall between N.N.E. and S.S.E. A very severe squall from the Ed. Wind in squall S.Ely, force 9 (2 entries). N.N.E. squall, force 7, for three hours. N. b. W. squall, force 7, for one hour. N.Ely. squall, force 8. Sn. limit of N.E. Trade, 23rd, 1st, 17th, 9th, 15th, 21st, 17th. Wind shifting from S.E. b. E. to W. b. S. in the squall.—Wind from all directions in slight squalls of a few minutes' duration. Sn. limit of N.E. Trade, 12th, 13th, 15th. Sn. limit of S.E. Trade, 28th, 14th. Sudden and heavy but short squall from Ed. A N.Wly. squall for three hours, but wind backed to the Sd.—13th, N.E. Trade ended in a squall from the Sd.—Arched squalls rising from all quarters with no wind.—Wind suddenly shifted from S. b. E. to the Nd. Got a warm dry S.E. wind, thermometer rose at once from 75° to 79°.—Fierce S.Ely. gusts, nearly calm between them. Lost N.E. Trade suddenly in a shower. Sn. limit of N.E. Trade, 17th and 7th. Sn. limit of S.E. Trade, 26th, 16th, 14th, 28th, 17th, 18th. Continual squalls, wind flying nearly round the compass. Wind in light puffs of 15 or 20 minutes' duration. Constant succession of violent squalls. Fierce gusts of wind from S.E., with almost calm between. Passed from S.E. to N.E. Trade without a calm. Sn. limit of N.E. Trade, 17th. Sn. limit of S.E. Trade, 17th. Passed from one Trade to the other without a calm. Puffs of wind in squalls get heavier, ship from the Nd. Light variable wind from S.W. b. S. to S.E. b. S. Squalls generally from E. b. N.—The S.S.E. wind veering greatly with slight squalls. Sn. limit of S.E. Trade, 14th.		
2° - 3° N.	- - -	- - 1 -	- - -	- 3 2	- - -	- - -	- - -	- - -	27 & 29 23-29 20 21 22 26 27 14 12 18 19 02 & 05	Sn. limit of N.E. Trade, 29th. Sudden shift of wind to S.W., with furious squalls and heavy rain. 25th, unsteady S.Ely. wind (3 entries). —Wind in slight variable puffs from the Ed. N.N.E. breeze coming in sudden gusts. Sn. limit of N.E. Trade, 29th, 6th. Wind very variable between E.S.E. and S.S.E. 27th, very violent squall from the Sd., with vivid forked l. in the N.Wd. Sn. limit of N.E. Trade, 18th, 5th, 27th. Heavy squalls from N. to S.S.E., force 7, with t. l. r. 18th, wind shifted suddenly from N.E. to S. Sn. limit of N.E. Trade, 17th. Squall between N.N.E. and S.S.E. A very severe squall from the Ed. Wind in squall S.Ely, force 9 (2 entries). N.N.E. squall, force 7, for three hours. N. b. W. squall, force 7, for one hour. N.Ely. squall, force 8. Sn. limit of N.E. Trade, 23rd, 1st, 17th, 9th, 15th, 21st, 17th. Wind shifting from S.E. b. E. to W. b. S. in the squall.—Wind from all directions in slight squalls of a few minutes' duration. Sn. limit of N.E. Trade, 12th, 13th, 15th. Sn. limit of S.E. Trade, 28th, 14th. Sudden and heavy but short squall from Ed. A N.Wly. squall for three hours, but wind backed to the Sd.—13th, N.E. Trade ended in a squall from the Sd.—Arched squalls rising from all quarters with no wind.—Wind suddenly shifted from S. b. E. to the Nd. Got a warm dry S.E. wind, thermometer rose at once from 75° to 79°.—Fierce S.Ely. gusts, nearly calm between them. Lost N.E. Trade suddenly in a shower. Sn. limit of N.E. Trade, 17th and 7th. Sn. limit of S.E. Trade, 26th, 16th, 14th, 28th, 17th, 18th. Continual squalls, wind flying nearly round the compass. Wind in light puffs of 15 or 20 minutes' duration. Constant succession of violent squalls. Fierce gusts of wind from S.E., with almost calm between. Passed from S.E. to N.E. Trade without a calm. Sn. limit of N.E. Trade, 17th. Sn. limit of S.E. Trade, 17th. Passed from one Trade to the other without a calm. Puffs of wind in squalls get heavier, ship from the Nd. Light variable wind from S.W. b. S. to S.E. b. S. Squalls generally from E. b. N.—The S.S.E. wind veering greatly with slight squalls. Sn. limit of S.E. Trade, 14th.		
1° - 2° N.	- - -	- - 1 1	- - -	- - -	- - -	- - -	- - -	- - -	14 12 18 19 02 & 05	Sn. limit of N.E. Trade, 29th. Sudden shift of wind to S.W., with furious squalls and heavy rain. 25th, unsteady S.Ely. wind (3 entries). —Wind in slight variable puffs from the Ed. N.N.E. breeze coming in sudden gusts. Sn. limit of N.E. Trade, 29th, 6th. Wind very variable between E.S.E. and S.S.E. 27th, very violent squall from the Sd., with vivid forked l. in the N.Wd. Sn. limit of N.E. Trade, 18th, 5th, 27th. Heavy squalls from N. to S.S.E., force 7, with t. l. r. 18th, wind shifted suddenly from N.E. to S. Sn. limit of N.E. Trade, 17th. Squall between N.N.E. and S.S.E. A very severe squall from the Ed. Wind in squall S.Ely, force 9 (2 entries). N.N.E. squall, force 7, for three hours. N. b. W. squall, force 7, for one hour. N.Ely. squall, force 8. Sn. limit of N.E. Trade, 23rd, 1st, 17th, 9th, 15th, 21st, 17th. Wind shifting from S.E. b. E. to W. b. S. in the squall.—Wind from all directions in slight squalls of a few minutes' duration. Sn. limit of N.E. Trade, 12th, 13th, 15th. Sn. limit of S.E. Trade, 28th, 14th. Sudden and heavy but short squall from Ed. A N.Wly. squall for three hours, but wind backed to the Sd.—13th, N.E. Trade ended in a squall from the Sd.—Arched squalls rising from all quarters with no wind.—Wind suddenly shifted from S. b. E. to the Nd. Got a warm dry S.E. wind, thermometer rose at once from 75° to 79°.—Fierce S.Ely. gusts, nearly calm between them. Lost N.E. Trade suddenly in a shower. Sn. limit of N.E. Trade, 17th and 7th. Sn. limit of S.E. Trade, 26th, 16th, 14th, 28th, 17th, 18th. Continual squalls, wind flying nearly round the compass. Wind in light puffs of 15 or 20 minutes' duration. Constant succession of violent squalls. Fierce gusts of wind from S.E., with almost calm between. Passed from S.E. to N.E. Trade without a calm. Sn. limit of N.E. Trade, 17th. Sn. limit of S.E. Trade, 17th. Passed from one Trade to the other without a calm. Puffs of wind in squalls get heavier, ship from the Nd. Light variable wind from S.W. b. S. to S.E. b. S. Squalls generally from E. b. N.—The S.S.E. wind veering greatly with slight squalls. Sn. limit of S.E. Trade, 14th.		
0° - 1° N.	- - -	- - 1 -	- - -	- - -	- - -	- - -	- - -	- - -	02 & 05	Sn. limit of N.E. Trade, 29th. Sudden shift of wind to S.W., with furious squalls and heavy rain. 25th, unsteady S.Ely. wind (3 entries). —Wind in slight variable puffs from the Ed. N.N.E. breeze coming in sudden gusts. Sn. limit of N.E. Trade, 29th, 6th. Wind very variable between E.S.E. and S.S.E. 27th, very violent squall from the Sd., with vivid forked l. in the N.Wd. Sn. limit of N.E. Trade, 18th, 5th, 27th. Heavy squalls from N. to S.S.E., force 7, with t. l. r. 18th, wind shifted suddenly from N.E. to S. Sn. limit of N.E. Trade, 17th. Squall between N.N.E. and S.S.E. A very severe squall from the Ed. Wind in squall S.Ely, force 9 (2 entries). N.N.E. squall, force 7, for three hours. N. b. W. squall, force 7, for one hour. N.Ely. squall, force 8. Sn. limit of N.E. Trade, 23rd, 1st, 17th, 9th, 15th, 21st, 17th. Wind shifting from S.E. b. E. to W. b. S. in the squall.—Wind from all directions in slight squalls of a few minutes' duration. Sn. limit of N.E. Trade, 12th, 13th, 15th. Sn. limit of S.E. Trade, 28th, 14th. Sudden and heavy but short squall from Ed. A N.Wly. squall for three hours, but wind backed to the Sd.—13th, N.E. Trade ended in a squall from the Sd.—Arched squalls rising from all quarters with no wind.—Wind suddenly shifted from S. b. E. to the Nd. Got a warm dry S.E. wind, thermometer rose at once from 75° to 79°.—Fierce S.Ely. gusts, nearly calm between them. Lost N.E. Trade suddenly in a shower. Sn. limit of N.E. Trade, 17th and 7th. Sn. limit of S.E. Trade, 26th, 16th, 14th, 28th, 17th, 18th. Continual squalls, wind flying nearly round the compass. Wind in light puffs of 15 or 20 minutes' duration. Constant succession of violent squalls. Fierce gusts of wind from S.E., with almost calm between. Passed from S.E. to N.E. Trade without a calm. Sn. limit of N.E. Trade, 17th. Sn. limit of S.E. Trade, 17th. Passed from one Trade to the other without a calm. Puffs of wind in squalls get heavier, ship from the Nd. Light variable wind from S.W. b. S. to S.E. b. S. Squalls generally from E. b. N.—The S.S.E. wind veering greatly with slight squalls. Sn. limit of S.E. Trade, 14th.		
Sum	-	2, one N.Ely. one S.Ely.	1 - 12	5 1 2	6 9	- 1 3	1 - -	2 1				

Table 3 shows that only two steady winds of force 7 were recorded in May, the one being N.Ely., the other S.Ely.

In April there were nine heavy squalls from some Nly. direction, and the same number from some Sly.; in May there are only six from some Nly., whilst there are 11 from some Sly., indicating the increasing power of the Sly. wind. The "Remarks" in Table 3 show that gusts and puffs of wind were very common in May.

CURRENTS.

TABLE 4.—LATERAL STRIPS.

Lateral Strips. 10° of Longitude by 1° of Latitude.	No. of Observations.	Mean Rate.	N. to E. by N. or N.Ely.		E. to S. by E. or S.Ely.		S. to W. by S. or S.Wly.		W. to N. by W. or N.Wly.		None.	Prevailing Current.		Strongest Current.*	
			%	Mean Rate.	%	Mean Rate.	%	Mean Rate.	%	Mean Rate.		No. of Observations. Direction.	Mean Rate.	Direction.	Rate.
9° to 10° N.	35	11	3	15	14	10	43	16	17	15	23	S.W. by S.	13	W. by S.	40
8° - 9° N.	35	12	11	11	9	16	20	18	31	19	29	W.	21	W.	39
7° - 8° N.	46	11	9	17	15	14	20	13	26	20	30	W.	18	N.W. by W.	44
6° - 7° N.	55	12	15	14	16	14	26	17	18	16	25	W.	15	S.S.W.	39
5° - 6° N.	33	13	6	15	31	20	24	18	15	13	24	E.	20	E.S.E.	38
4° - 5° N.	44	16	27	19	34	21	7	16	16	18	16	E.	27	W. by N.	50
3° - 4° N.	35	19	34	22	23	24	3	12	31	16	9	E.	35	E.	50
2° - 3° N.	47	15	11	12	4	15	11	15	57	20	17	W.	21	W.	40
1° - 2° N.	44	22	7	19	9	12	16	24	61	25	7	W. by N.	30	W. by N.	56
0° - 1° N.	56	18	7	24	4	9	18	23	59	20	12	W.	19	W. by N.	47

TABLE 5.—VERTICAL STRIPS.

Vertical Strips. 10° of Latitude by 1° of Longitude.	No. of Observations.	Mean Rate.	N. to E. by N. or N.Ely.		E. to S. by E. or S.Wly.		S. to W. by S. or S.Wly.		W. to N. by W. or N.Wly.		None.	Prevailing Current.		Strongest Current.*	
			%	Mean Rate.	%	Mean Rate.	%	Mean Rate.	%	Mean Rate.		No. of Observations. Direction.	Mean Rate.	Direction.	Rate.
20° to 21° W.	28	13	7	15	21	19	18	13	25	23	29	E.S.E.	24	W.N.W.	50
21° - 22° W.	32	16	9	17	25	20	22	23	25	18	19	W. by S.	35	W. by S.	48
22° - 23° W.	51	16	10	16	20	21	14	21	29	24	27	W.	24	E.	50
23° - 24° W.	50	16	14	19	22	17	14	23	36	19	14	W.	17	N.E.	41
24° - 25° W.	60	15	18	22	22	13	15	14	30	21	15	W.	21	W. by N.	56
25° - 26° W.	57	13	18	13	11	17	19	17	26	21	26	W.	15	W. by N.	50
26° - 27° W.	47	16	4	16	15	19	23	16	45	19	13	W.	11	W. by N.	47
27° - 28° W.	42	15	17	19	5	16	12	13	45	20	21	W. by N.	23	W. by N.	53
28° - 29° W.	33	15	12	20	3	7	33	16	43	17	9	W.	17	N. by E.	37
29° - 30° W.	30	14	13	17	3	13	20	18	47	16	17	N.N.W.	14	E.N.E.	37

* The Strongest Current in each Strip is here given, as it is important to the Navigator to know the extreme to which he is liable.

Table 4 shows that N.Wly. currents prevail from the Equator to 3° N.; between 1° and 2° N. their mean speed is 25 miles in 24 hours; from 3° to 5° N. the prevailing current is Ely., whilst from 6° to 10° N. it is Wly. Between 3° and 4° N. there is 34% of N.Ely. current, having a mean speed of 22 miles in 24 hours, and 23% of S.Ely. current averaging 24 miles in 24 hours, whilst between 4° and 5° N. there is 34% of S.Ely., having a mean speed of 21 miles in 24 hours.

A glance at the Diagrams on the lower right-hand corners of the Charts shows how the Ely. current has increased since April, also that it lies between the Wly. currents caused by the N.E. and S.E. Trades, and drifts from that part of the sea where the Trades meet.

Table 5, the red arrows in the Diagram, and the percentages of current in the En. and Wn. strips on the published Chart show that there is more Ely. current on the En. than on the Wn. side of the square, whilst with Wly. currents this order is reversed.

Between 3° and 7° N. there are more *remarks* on Ely. than on Wly. currents. Current rips are most frequently recorded between 6° and 9° N.; between 6° and 8° N. they were much more frequent on the En. than on the Wn. side of the square, partly perhaps because observations generally were more abundant to the Ed.

The following remarks seem worthy of extraction:

Latitude.	Sub-square.	Remarks on Currents.	
		NOTE. A bar, thus —, separates the Remarks from different Logs.	
9° to 10° N.	92	Short chopping sea in patches caused by current.	
	97	Rippling in patches, we sail through them in from 15 minutes to an hour.	
8° - 9° N.	86	Strong rippling for 3 hours.	
7° - 8° N.	70	Several ripples going to N.N.E.; wind N.W. by N.	
	71	Strong ripples in lines N.N.E. and S.S.W.; wind N. by W., 2.—Strong ripples in lines E.N.E. and W.S.W.; no wind.*	
	74	Several strong noisy tide rips from W. by N. to E. by S.; wind N.Ely.	
6° - 7° N.	61	Strong rippings extending in lines N.E. and S.W., progressing slowly to the S.Ed.; wind N.W.	
5° - 6° N.	54	Very heavy ripples running N.Wly; wind S.S.Ely. (2 entries).	
4° - 5° N.	43	Extensive tide rips.—No current for two days: ship from the Nd.—Sea in a boil.	
2° - 3° N.	21	Lost the Ely. set. (Ship from the Nd.)	
1° - 2° N.	16	For the first time experienced the Wly. equatorial current. (Ship from the Nd.)	

SEA.

The sea was remarked on as "luminous" nineteen times, of these fourteen were in the Sn. half of the square. Fifteen of the nineteen were "very luminous," of these thirteen were in the Sn. half of the square. It was "extremely luminous" four times between 1° and 4° N. Hence the luminosity seems to have been chiefly confined to the Wly. current in the Sn. part of the square.

It was "dark blue" twenty-two times, of these, sixteen were in the Sn. half of the

* No wind, means that it was calm at the time.

square. It was "green" once, and "dark green" six times; they were pretty equally divided over the square.

Latitude.	Sub-square.	Remarks on Sea.
NOTE. A bar, thus—, separates the Remarks from different Logs.		
8° to 9° N.	86	Large luminous patches in the sea. (2 entries.)
7° - 8° N.	70	11th, 1859. Water discoloured as if on soundings. Sea dark green.
4° - 5° N.	44	Sea black. Water dark green (2 entries).
3° - 4° N.	33	22nd, 1856. Saw several patches of discoloured water about a mile on the starboard bow; they ran in a N.E. and S.W. direction and were about one mile long. They were in lat. 3° 30' N. and long. 23° W.
	39	7.45 p.m. 19th, 1871. Passed suddenly from very luminous to dark water, the line of separation being very clearly defined. (Ship going N.)
Sea temperature.		
3° - 4° N.	37	At surface 83.6 at 10 feet below 82.
2° - 3° N.	28	" 82.4 at 25 fms. " 82.
0° - 1° N.	09	" 82 at 25 fms. " 80.

The decreased percentage and force of Nly. winds in May, combined with the increase of Sly. winds have affected the sea, for now between 0° and 4° N., "Swell or Seas" from some Sn. quarter are more frequent than those from some Nn.; and the 1° data show that on the En. side of the square (where the Nly. winds are very light) the Sly. swell prevails up to 5° N. Confused seas are most abundant between 2° and 6° N. on the Wn. side of the square.

CLOUDS.

Tables 6, 7, and 8, with the remarks on Clouds, are compiled from the data for 1° sub-squares.

TABLE 6.—LATERAL STRIPS.

PERCENTAGES of each FORM, and MEAN AMOUNT of all CLOUDS.

Lateral Strips. 10° of Longitude by 1° of Latitude.	No. of Observations.	Upper Clouds.			Lower Clouds.				Amount, 10 being "Com- pletely Clouded."	
		Cir.	Cir.-c.	Cir.-s.	Cum.	Cum.-s.	Str.	Nim.	No. of Obs.	Mean.
		%	%	%	%	%	%	%		
9° to 10° N. -	97	13	15	8	54	8	12	4	121	5.1
8° - 9° N. -	135	14	19	5	58	9	13	7	161	5.3
7° - 8° N. -	162	15	12	5	53	14	8	14	209	5.3
6° - 7° N. -	178	13	14	11	43	15	17	21	213	6.0
5° - 6° N. -	214	13	15	13	40	16	15	32	238	6.9
4° - 5° N. -	244	9	12	10	31	16	18	38	275	6.9
3° - 4° N. -	253	5	14	4	36	23	15	34	286	6.8
2° - 3° N. -	189	6	16	8	34	19	13	34	224	6.6
1° - 2° N. -	181	9	17	13	42	10	8	22	220	5.8
0° - 1° N. -	195	8	17	9	53	9	10	19	209	4.9

TABLE 7.—VERTICAL STRIPS.

PERCENTAGES of each FORM, and MEAN AMOUNT of all CLOUDS.

Vertical Strips. 10° of Latitude by 1° of Longitude.	No. of Observations.	Upper Clouds.			Lower Clouds.				Amount, 10 being "Com- pletely Clouded."	
		Cir.	Cir.-c.	Cir.-s.	Cum.	Cum.-s.	Str.	Nim.	No. of Obs.	Mean.
		%	%	%	%	%	%	%		
20° to 21° W. -	147	7	12	11	41	22	8	22	161	5.7
21° - 22° W. -	153	8	25	3	36	24	10	25	180	6.1
22° - 23° W. -	154	6	20	13	39	21	5	20	168	5.8
23° - 24° W. -	234	9	15	11	50	9	18	26	243	6.1
24° - 25° W. -	276	12	14	12	43	12	16	28	301	6.1
25° - 26° W. -	236	11	13	4	37	19	11	22	267	6.1
26° - 27° W. -	188	13	20	11	36	8	27	29	238	6.5
27° - 28° W. -	183	14	11	5	44	14	13	27	227	6.3
28° - 29° W. -	123	11	7	7	54	8	13	28	175	6.1
29° - 30° W. -	154	8	14	8	47	12	6	19	196	5.9

The mean of the means in the ten strips of Table 6 shows that the Mean Amount of Cloud for the whole square is about 6.0, or 0.8 more than in April. By comparing the amounts in the various strips it is shown that the greatest increase (1.6) lies between 5° and 6° N., the average increase in the Nn. half of the square is 1.3 for each strip, and it is very uniformly spread throughout them. The increase extends, but to a less degree, down to 2° N. From 0° to 2° N. there is less cloud than in April, indicating the Nn. progress of the S.E. Trade.

The percentage of Nimbus has increased between 2° and 9° N., the increase amounting to 25% between 5° and 6° N.; it has decreased between 0° and 2° N. The general mean (23%) shows an increase of 8% in the whole square since April. This is probably caused by the Nn. progress of the cooler Sly. wind.

Table 7, compared with the similar one for April, shows that the greatest increase in the Amount of Cloud and percentage of Nim. has been on the Wn. side of the square. Nim. seems to be very uniformly spread so far as longitude is concerned, but Cum.-s. seems to be much more abundant between 20° and 23° W. than in the rest of the square.

TABLE 8.

The following Table is derived from the Remarks on Clouds in May:—

NOTE.—All cloud entries from N. to E. b. N. inclusive have been given to the N.En. quarter.
 " " E. b. S. to S. S.En. "
 " " S. b. W. to W. b. S. S.Wn. "
 " " W. b. N. to N. b. W. N.Wn. "
 Upper clouds from E. or W. have been extracted in the Remarks. Lower clouds flying with the wind have not been recorded.

Quarters from which the Clouds and Wind came.		Lower Clouds.			Clouds (doubtful whether upper or lower).			Upper Clouds.		
Clouds from.	Wind from.	Total No. of Observations.	No. in Nn. half of Square.	No. in Sn. half of Square.	Total No. of Observations.	No. in Nn. half of Square.	No. in Sn. half of Square.	Total No. of Observations.	No. in Nn. half of Square.	No. in Sn. half of Square.
N.En.	N.En.	—	—	—	2	1	1	10	8	2
"	S.En.	4	—	4	1	—	1	10	1	9
"	S.Wn.	—	—	—	2	1	1	2	—	2
"	N.Wn.	1	—	1	—	—	—	2	2	—
"	N.	—	—	—	1	1	—	1	1	—
"	S.	—	—	—	—	—	—	2	—	2
"	E.	2	—	2	—	—	—	4	1	3
		7	—	7	6	3	3	31	13	18
S.En.	N.En.	2	1	1	5	4	1	38	19	19
"	S.En.	—	—	—	—	—	—	9	—	9
"	S.Wn.	—	—	—	1	—	1	6	2	4
"	N.Wn.	1	—	1	1	—	1	7	5	2
"	N.	1	—	1	1	1	—	1	1	—
"	S.	—	—	—	—	—	—	1	—	1
"	E.	—	—	—	—	—	—	1	—	1
		4	1	3	8	5	3	63	27	36
S.Wn.	N.En.	—	—	—	1	1	—	1	—	1
"	S.En.	—	—	—	1	—	1	4	—	4
"	S.Wn.	—	—	—	—	—	—	1	—	1
"	N.Wn.	—	—	—	1	1	—	2	1	1
"	N.	—	—	—	—	—	—	1	1	—
"	E.	—	—	—	—	—	—	2	2	—
		—	—	—	3	2	1	11	4	7
N.Wn.	N.En.	—	—	—	1	1	—	—	—	—
"	S.En.	—	—	—	—	—	—	1	—	1
"	S.Wn.	—	—	—	—	—	—	1	—	1
"	N.Wn.	—	—	—	—	—	—	1	1	—
"	N.	—	—	—	—	—	—	1	1	—
		—	—	—	1	1	—	4	2	2

NOTE.—The following are the percentages of upper clouds from various quarters, 109 being the total number of observations.

From the N.En. quarter 28% being — 7% since April.

" S.En. " 58 " " + 3 " "
 " S.Wn. " 10 " " + 2 " "
 " N.Wn. " 4 " " + 2 " "

The number of observations on the motion of upper clouds has decreased in both the Nn. and Sn. halves of the square since April. The decrease has been much greater in the Sn. than in the Nn. half.
 In both the Nn. and Sn. halves of the square the largest number of upper clouds was from the S.Ed., wind N.Ely.

Table 8 and its note explain themselves. There is now as much upper cloud from S.E., wind N.Ely., in the Nn. as in the Sn. half of the square, and there is scarcely any upper cloud from S.W. wind N.E., whilst in January there was 25%.

The following remarks on Clouds are considered worthy of extraction:

Latitude.	Sub-square.	Remarks on Clouds. NOTE. A bar, thus —, separates the Remarks from different Logs.
9° to 10° N.	90	Thin vapoury cir.-s. slowly from N.N.W., wind N.N.W.
	98	Thin rain clouds passing at times without rain.
8° — 9° N.	86	Clouds have been coming strong from S.E. by S., wind N.E. by E. (Ship from Nd.)
7° — 8° N.	70	Small black clouds moving slowly in various ways, wind fitful. Cir.-s. from various directions, wind N.N.Wly. Vapoury clouds moving slowly from all points, wind N.N.Wly.
	74	Upper clouds from S.S.W., no wind.* Heavy masses of cum.-s. from S.E. by S. and S.W. by W., wind E. by N.
	75	Lower clouds from E., no wind.—Scud very strong from E. by S.; wind E.N.Ely., force 3. Upper strata with many motions between S. by E. and E. by N., wind N.Ely.
6° — 7° N.	60	Clouds from various directions, wind N.
	63	Cir.-c. from Ed., wind E.N.E. (2 entries).
	67	Cir. from E.S.E., no wind.
5° — 6° N.	50	Clouds moving in a circuit.
	53	Lower clouds from Sd., wind N.E.
	54	Long ridges of clouds in the upper strata, like the fingers of a huge hand, stretching from the gloom in the S. to the zenith. Sky clearing to bright blue in the N.E., wind N.E. 5.
	55	Clouds from N.E., no wind.
	56	Clouds from various directions, no wind.
	58	After 5 a.m. sky slowly clouded over from S. with cir., then cir.-c., the lower clouds still coming with wind from N.N.E. until 10 a.m., when nim. came from S.; lost N.E. trade at 11 a.m. (Ship steaming fast to the Sd.).
4° — 5° N.	42	Clouds from N.E. and S.S.E., wind N.E.
	43	Cir.-s. from E., wind N. by E.—Cum. in dense masses all round horizon.—Cir.-s. from S.E. by E., no wind.
	46	Nim. rapidly from S.E. by S. and S.W., slowly from N. by W.; wind Nly., force 2 (2 entries).
3° — 4° N.	31	Upper clouds from Ed., lower from Nd., wind variable (2 entries).—Cir.-c. from S.S.E., no wind.—Cir.-c. from W.S.W., no wind.
	32	Clouds from S.S.W., no wind.—Scud strong from S.E. by S., no wind.
	33	Upper clouds from S.W. by S., lower from E. by N., wind S.E. Dense masses of cum. all round, no apparent motion (4 entries).
	37	Clouds revolving.—Upper clouds from S.E. by E., lower from S.S.E., no wind.
2° — 3° N.	21	Lower clouds from E., wind variable, S.Ely. (2 entries).—Many strata of clouds, each with a different motion; wind very variable. Cir.-c. from S.S.E., no wind (3 entries).
	24	Clouds from Ed., no wind.
1° — 2° N.	10	Cir.-c. from S.E., cum.-s. from N.N.E., wind S.E.—Clouds from S.W. by S., no wind.
	11	Clouds from S.E. by E., no wind.—Clouds from E., no wind.
	12	Clouds from S.E. by S., no wind.
	13	Clouds strong from E. by S., wind E.S.E. 1.
	19	Cir.-c. from N.E. by E., cir.-s. from S.E. by E., wind S.E.
0° — 1° N.	00	Vapoury cum. slowly from the Sd., wind S.Ely.
	02	Cir.-s. from E. by N., lower clouds from S.W. by S., wind S.E.
	03	Lower clouds from N.E. by N., no wind.
	05	Cir.-c. from S.E. by S., no wind (3 entries).
	08	Clouds from S. by E., no wind.

* No wind, means that it was calm at the time.

WEATHER.

TABLE 9.—LATERAL STRIPS.

Lateral Strips, being 10° of Longitude by 1° of Latitude.				Thunder. (t.) %	Lightning. (l.) %	Squalls. (q.) %	Rain. (r.) %	Mist or Haze. (m.) %	Dew. (w.) %
9° to 10° N.	-	-	-	-	1	2	3	17	8
8° - 9° N.	-	-	-	-	2	2	3	13	2
7° - 8° N.	-	-	-	2	3	7	6	14	4
6° - 7° N.	-	-	-	2	8	10	13	9	2
5° - 6° N.	-	-	-	5	11	13	24	9	-
4° - 5° N.	-	-	-	2	10	9	30	5	3
3° - 4° N.	-	-	-	3	9	12	26	2	4
2° - 3° N.	-	-	-	1	8	18	20	6	1
1° - 2° N.	-	-	-	1	6	12	13	3	2
0° - 1° N.	-	-	-	-	2	7	9	5	4

TABLE 10.—VERTICAL STRIPS.

Vertical Strips, being 10° of Latitude by 1° of Longitude.				Thunder. (t.) %	Lightning. (l.) %	Squalls. (q.) %	Rain. (r.) %	Mist or Haze. (m.) %	Dew. (w.) %
20° to 21° W.	-	-	-	4	7	11	17	3	1
21° - 22° W.	-	-	-	1	6	8	14	3	-
22° - 23° W.	-	-	-	2	12	10	15	4	1
23° - 24° W.	-	-	-	2	6	11	17	9	3
24° - 25° W.	-	-	-	2	8	11	18	12	2
25° - 26° W.	-	-	-	2	7	9	20	9	3
26° - 27° W.	-	-	-	2	8	7	19	8	3
27° - 28° W.	-	-	-	2	4	12	15	7	2
28° - 29° W.	-	-	-	-	1	8	15	10	3
29° - 30° W.	-	-	-	2	3	12	13	4	3

TABLE 11.—LIGHTNING.

This Table gives the bearing on which Lightning was seen in the various Lateral Strips. Only the bearings recorded as actually N., S., E., or W., have been given to those points.

Lateral strips, being 10° of Longitude by 1° of Latitude.				Number of Observa- tions.	N.	N.E.	E.	S.E.	S.	S.W.	W.	N.W.	All round	No direction given.
9° to 10° N.	-	-	-	-	-	-	-	-	-	-	-	-	-	-
8° - 9° N.	-	-	-	3	-	1	-	2	-	-	-	-	-	-
7° - 8° N.	-	-	-	6	-	1	-	2	-	-	-	-	-	-
6° - 7° N.	-	-	-	18	-	3	-	7	2	2	-	1	-	-
5° - 6° N.	-	-	-	10	2	1	1	1	1	1	-	2	-	3
4° - 5° N.	-	-	-	16	-	5	1	3	3	-	1	-	-	1
3° - 4° N.	-	-	-	13	1	3	2	2	-	1	-	1	-	3
2° - 3° N.	-	-	-	7	3	2	1	-	-	-	-	1	-	3
1° - 2° N.	-	-	-	3	-	1	-	1	-	1	-	-	-	-
0° - 1° N.	-	-	-	2	1	1	-	-	-	-	-	-	-	-
Total for month and how distributed					78	7	18	5	18	6	7	1	6	10

The means of the various percentages in Table 9, compared with the corresponding ones for April, show that thunder, lightning, and haze have decreased, whilst squalls, rain, and dew have increased. By comparing the data of individual strips for the two months the greatest decrease of thunder and lightning is found between 2° and 5° N., whilst lightning has increased between 5° and 7° N.

The percentage of squalls has increased in nearly every strip, most between 5° and 7° N., where there has also been the greatest increase of lightning and rain, and decrease of mist. These facts show that the largest amount of Doldrum weather has advanced more than 2° to the Nd. since April: the wind data indicate that the S.E. Trade has made a similar advance. Between 2° and 8° N. about one in fifteen of the squalls was heavy, whilst in the same zone there were nine very heavy squalls; these latter have generally been noticed in the Remarks of Table 3.

Rain has increased between 3° and 10° N., and decreased between 0° and 3° N. since April. Mist has just reversed the above order, having decreased between 3° and 10° N. and increased between 0° and 3° N. This inverse relation between rain and mist has already been noticed. Dew has *increased* most in the Sn. part of the square, where the cooler water of the S.E. Trade has begun to show itself; there is, however, still most dew in the Nn. part of the square, where the sea is coldest; between 9° and 10° N. it continues to have the large amount of 8%.

Table 10 shows that thunder, lightning, and squalls were slightly more abundant in the En. than in the Wn. half of the square, whilst mist and dew were most abundant in the Wn. half.

Table 11 shows that lightning has been most frequently seen on some Sly. bearing between 6° and 9° N., and on some Nly. bearing between 0° and 4° N. Table 1 shows that between 4° and 5° N. there is the lowest mean force of wind, and that *there* N.Ely. winds have a larger percentage than S.Ely., whilst between 3° and 4° N., where the mean force is nearly the same, S.Ely. winds prevail over N.Ely., so that we should expect to find the source of lightning at the meeting of the winds, between 3° and 5° N., as indicated by its bearing. There is still much more lightning seen in Ely. than in Wly. directions.

The following remarks on Weather give the direction in which *certain kinds* of lightning were seen, &c.

Latitude.	Sub-square.	Remarks on Weather. NOTE. A bar, thus —, separates the Remarks from different Logs.
9° to 10° N.	90 97 99	Close and sultry. The sky appears overloaded with electricity and water. Much brighter to the Nd. We are entering the cloud ring of the Equator. High gray dawn.
8° - 9° N.	86	Distant flash l. on S.En. horizon (2 entries).
7° - 8° N.	75	Vivid forked l. in N.W.
6° - 7° N.	60 63 65 66 68	Sheet l. in E.S.E. (2 entries). Sheet l. in S.E. A little sheet l. Sheet l. in S.E. Oppressively hot atmosphere. Heavy forked l. flying about the decks in all directions, with heavy thunder.
5° - 6° N.	50 52 56 57	Sheet l. to the Ed. Excessively sultry and suffocating, wind S. ½ W. l. One or two flashes of forked l. Ring round the moon.
4° - 5° N.	40 44 45 46 48 49	Thunder in the S.Ed. Sheet l. in E. Large halo round moon. Very much rain on the 22nd, estimated that more than a foot fell on board. Sheet l. (2 entries).—Forked l.—Sheet l. in N.E. Distant t. to the S.Ed. A large waterspout to the Sd. travelling fast to S.S.W., wind calm to variable. Very large circle round the moon.
3° - 4° N.	31 33 34 35	Sheet l. in N.E. Sheet l. between N. and W. Sheet l. to the Ed. Distant t. in N.W. Forked l. and heavy r. (2 entries). Sheet l. (2 entries).
2° - 3° N.	21	Sheet l. to the Nd. (2 entries). Sheet l. in the E.
1° - 2° N.	15 19	Have never experienced such changeable weather. St. Elmo's light on the main royal-mast head; there was heavy rain, with a few flashes of distant l.; the wind was E.S.E., 3; the light was very brilliant for half an hour; it appeared as a dull flame on the lee side of the mast. Felt the lightning conductor, but no sign of an electric current.
0° - 1° N.	09	Throughout the day heavy squally looking clouds hanging in the N., the sky of a dull leaden appearance.

GENERAL REMARKS.

The following extracts have been made from the "Remarks" in various logs.

NATURAL HISTORY.

Latitude.	Sub-square.	Remarks on Natural History.
<i>Land Birds and Insects.</i>		
9° to 10° N.	91 95	A bird like a land bird. A land bird of the <i>Snipe</i> family.
7° - 8° N.	74	A beautiful <i>Hawk</i> alighted several times on the ship, but did not seem much fatigued.
6° - 7° N.	66	Several land birds.
4° - 5° N.	44	A <i>Dragon-fly</i> about the ship.
<i>Cetacea.</i>		
7° - 8° N.	70	A <i>Whale</i> playing near the ship.
4° - 5° N.	44	<i>Blackfish</i> going N.E.
1° - 2° N.	19	Several <i>Blackfish</i> .
2° - 8° N.	- -	<i>Porpoises</i> were seen in sub-squares 75, 76, 52, 54, 25. In 75 they were going N. by W., in 76 N.E., in 54 N. by W., and in 25 S.S.W.
<i>Fish, &c.</i>		
0° - 10° N.	- -	<i>Albicore</i> s were seen in sub-squares 97, 52, 54, 21, * 01.
7° - 9° N.	- -	<i>Bonitos</i> " " 81 and 75.
5° - 7° N.	- -	<i>Dolphins</i> or <i>Coryphæna</i> " 63 and 53. In 63 many young dolphins.
0° - 10° N.	- -	<i>Flying Fish</i> " 97, 86, 89, 62, 65, 66, 54, 49, 32, 21, 29, 01, 09 (twice). In s.-s. 89 they were much smaller than further to the Nd.
5° - 9° N.	- -	<i>Skipjacks</i> were seen in sub-squares 81, 50, and 52.
1° - 6° N.	- -	<i>Sharks</i> " " 52, 44, 29, 17, 19. In 44 it was a large white shark. In 29. Passed a large black shark spotted all over with white spots about 2 inches in diameter, and distant from each other about 4 to 6 inches. It appeared to be from 20 to 25 feet long; it swam under the stern for a very short time, and then disappeared. It appeared at least three times the size of the ordinary sharks I have seen in deep water.
2° - 7° N.	- -	<i>Fish</i> (no names given) were seen in sub-squares 62, 52, 50, 26.
8° - 9° N.	- -	<i>Portuguese-men-of-war</i> " 88.
<i>Remarks.</i>		
8° - 9° N.	80	Great quantities of <i>Animalcules</i> .
7° - 8° N.	70	Sea full of <i>Mollusks</i> , <i>Medusæ</i> , <i>Physalia</i> , and other gelatinous species.
5° - 6° N.	53	Sea contains many <i>Medusæ</i> .
2° - 3° N.	21	Many <i>Acalephæ</i> .
<i>Sea Birds.</i>		
2° - 3° N.	- -	<i>Boobies</i> were seen in sub-square 25. Two large ones going E.
5° - 7° N.	- -	<i>Birds</i> (supposed to have been sea birds) were seen in sub-squares 62 (twice) and 54.
1° - 7° N.	- -	<i>Stormy Petrels</i> " " 62, 66, 57, 49, and 17.

* One dot indicates that the creatures were abundant; two dots that they were very abundant, &c.,

FALLING STARS.

There are 12 entries of Falling Stars, distributed over six years between 1856 and 1864; of these four were in 1859, three in 1853, two in 1856. The following remarks seem worthy of extraction :—

Sub-Square.	Hour.	Day.	Year.	Remarks on Falling Stars.
08	4.10 a.m.	10	1856	An uncommonly brilliant meteor fell; its course (as the mate informed me) was from S.E. b. E. to N.W. b. W., its greatest lustre continued about four seconds, it then burst at an altitude of 50° or 60° above the N.Wn horizon, exhibiting the appearance of a turf coal taken out of the fire and dashed violently against the wall; i.e., the globe of pale blue light burst, exhibiting brushy bright sparks, changing to dull red, and vanishing. This appearance continued several minutes; its course was traced from 20° or 30° above the S.En horizon to where it burst, by the fine matter which had flown off it in its course. The sky was clear at the time, no dew falling, and light Trade-wind cum. low on the horizon.
02	Midnight	2	1861	Several meteors.
13	8 p.m.	24	1863	The brightest meteor I have ever seen; it fell from the Wd. towards N. at an angle of 45°, it was quite blue, flashing at times red and white, like the balls of a rocket.
37	7.50 p.m.	29	1863	A splendid star shot from the constellation "Crux" and descended slowly about W.N.W. for 35° or 40°, appearance like a rocket from a balloon. Several other shooting stars, but weak, they descended toward S. and S.E., and ceased at midnight.
53	9.30 p.m.	21	1864	A magnificent meteor of a purplish red colour from about midway between Jupiter and Antares, N.Ely toward horizon, disappearing about 10° above it. Its motion much slower than ever observed before, and although dense masses of misty cum. were in its track, there was no diminution in its brilliancy until it disappeared entirely.

TEMPERATURE OF RAIN AND AIR.

Sub-Square.	Temperature of Rain.	Temperature of Air.	Remarks.
94	74°0	77°0	In this case the rain was caught aloft; air was tried on deck.
73	70°2	77°0	
74	75°5	80°0	
	76°0	77°4	
56	76°0	77°0	
57	73°5	82°0	
31	76°0	80°3	
32	74°0	78°0	
	75°0	78°0	
34	76°0	79°0	
36	73°5	76°9	Rain on topsail yard; air on deck.
37	73°5	77°0	
21	75°5	78°7	
22	75°0	76°0	
28	75°0	78°6	
11	76°4	79°2	
	75°3	78°1	
15	75°0	80°0	
	18) 85°4	18) 150°2	
	74°7	78°3	Difference 3°·6.

Sub-square.	VARIOUS.
08	20th, 1862. In about lat. 0° 34' N., long. 28° 12' W., H.M.S. "Swallow" sounded with $\frac{2000}{2000}$ fathoms, lead 80 lbs., no bottom. 23rd, 1862. In about lat. 0° 8' N., long 28° 32' W., H.M.S. "Swallow" sounded 1,730 fathoms, sand with black specks.
09	22nd 1862. In about 0° 30' N., 29° 29' W., H.M.S. "Swallow" sounded with $\frac{2000}{2000}$ fathoms, lead 60 lbs., no bottom. 6 a.m., temp. at 50 feet above the sea 78°, on deck 79°.

BEST ROUTES FOR CROSSING THE EQUATOR.

Appendix B. shows that in May the mean force of *all* winds is decidedly greater to the Wd. than to the Ed. of the Cape Verd Islands. It also shows that, except between 10° and 12° N., N.Ely. winds have a similar force on both sides of those Islands, but that there is a much larger percentage of them to the Wd. than to the Ed. In the En. half of the square there is a large percentage of N.Wly. wind; abreast of the islands (between 14° and 16° N.) it amounts to 41%, and as the force of the N.Wly. wind is very decidedly lower than that of the N.Ely., it causes a great decrease in the mean force of all winds. Besides the N.Wly. there is 13% of very light S.Wly. wind immediately to the Ed. of the Islands.

The following Table may be usefully consulted with the May Table of Appendix B. It shows the three points of each quarter of the compass, from which the wind prevails in each half of Square 39, and proves that the N.Ely. wind of the Wn. half is more Ely. than that of the En. half; also that the S.Ely. winds are generally E., and that the N.Wly. winds are generally N. by W. or N.N.W.

TABLE 12.

The Direction of the three Prevailing Winds of each quarter of the compass in each half of Square 39. They are in the order of their prevalence. A dash under a letter or figure indicates extreme prevalence.

Latitude.	N. to E. b. N., or N.Ely. Winds.		E. to S. b. E., or S.Ely. Winds.		S. to W. b. S., or S.Wly. Winds.		W. to N. b. W., or N.Wly. Winds.	
	Wn. half. 25° to 30° W.	En. half. 20° to 25° W.	Wn. half. 25° to 30° W.	En. half. 20° to 25° W.	Wn. half. 25° to 30° W.	En. half. 20° to 25° W.	Wn. half. 25° to 30° W.	En. half. 20° to 25° W.
	Points from North.	Points from North.	Points from South.	Points from South.	Points from South.	Points from South.	Points from North.	Points from North.
18° to 20° N.	4, 5, 3	4, 2, 3	8, - -	- - -	6, - -	- - -	6, 1, -	1, 2, 3
16° - 18° N.	4, 3, 2	3, 4, N	8, 7, 1	4, - -	- - -	2, - -	2, 1, -	2, 1, 6
14° - 16° N.	4, 5, 3	2, N, 4	8, 5, -	4, - -	- - -	7, 6, 2	2, - -	1, 3, 2
12° - 14° N.	3, 4, 6	N, 4, 1	8, 7, -	8, 7, 6	- - -	3, 5, -	1, 2, -	1, 2, 4
10° - 12° N.	3, 2, 4	3, 1, 6	8, - -	8, 6, 5	- - -	7, - -	1, 2, 5	2, 1, 4

The accompanying Chart for May, and the prevailing-wind-arrows on the Diagram in its lower right-hand corner, show that Nly. winds prevail from 4° to 10° N., getting stronger and more Ely. as you pass from the En. to the Wn. side of the square. (Before consulting the Chart it will be well to read the last paragraph on p. 9 which precedes the

Remarks for January.) The Chart and Diagram also show that from 0° to 4° N. S.Ely. winds prevail, and there does not seem to be much difference depending on the longitude, in the direction and force of those winds. The red sections on the Chart and current arrows on its Diagram show that between the Wly. current from 0° to 4° N., which is due to the S.E. Trade, and the lighter Wly. current from 6° to 10° N. due to the N.E. Trade, there is a very decided Ely. current. Table 4 shows that between 3° and 5° N. Ely. currents are nearly twice as frequent as Wly., and very strong; Table 5 and the En. and Wn. strips on the Chart show that in that zone they are much more common on the En. than on the Wn. side of the square.

Appendix C shows that, in Square 303 in May, the *prevailing* winds are more Southerly between 33° and 35° W. than between 30° and 33° W. This is best shown by running pencil lines down the Tables, making them pass through the largest percentage of wind for each point in the En. and Wn. parts. The mean direction of the *prevailing* winds for each degree of latitude is S.E. $\frac{3}{4}$ E. in the Wn. and S.E. by E. $\frac{1}{2}$ E. in the En. part. The mean force of *prevailing* winds in the Wn. part is 4.3, whilst it is 4.1 in the En. part. The mean of the mean forces of *all* winds is 4.3 in the Wn. and 4.0 in the En. part. By comparing the mean force of the wind for each degree of latitude in each part it is shown that from 0° to 6° S. the winds are very decidedly strongest in the Wn. part, whilst from 6° to 10° S. they are strongest in the En. part. There is also a larger percentage of variable wind in the Wn. than in the En. part between 6° and 8° S. This looks as if Cape St. Roque were the boundary of the change, having stronger winds to the Nd. than to the Sd. of it between 33° and 35° W., but just the reverse between 30° and 33° W.

The above facts seem to show that the *Outward-bound* ship should pass to the Wd. of the Cape Verd Islands, and stand to the Sd., so as to pass the parallel of 4° N. in about 24° W., or even further East, as the winds and no doubt the currents are opposed to her Sly. course as she closes with Cape St. Roque. The "Minero," Capt. Carruthers, crossed the Equator about 2 p.m. of the 20th in 31° W.; on the 21st she was in 1° 14' S. 32° 4' W.; 22nd, 2° 43' S. 32° 42' W.; 23rd, 3° 5' S. 32° 12' W., having stood to the Ed. with a Sly. wind for 14 hours; 24th, 4° 55' S. 32° 38' W.; 25th, 6° 21' S. 33° 22' W.; 26th, 6° 44' S. 32° 41' W., having stood to the S.Ed. for 14 hours with a S.S.Wly. and Sly. wind; 27th, 8° 4' S. 33° 35' W., having stood to the Ed. with a Sly. wind for 4 hours; 28th, 9° 39' S. 34° 16' W. The extreme range of her wind was from E. to S.S.W.; it was often very light, and she seems to have suffered by crossing the line so far to the Westward. Her currents were Wly., but not very strong.

The *Homeward-bound* ship should cross the Equator in 26° W. or even further West; she will thus avoid the large amount of light N.Wly. wind and calm which exists on the En. side of Square 3. Between 5° S. and the Equator the winds are stronger in the Wn. than in the En. part of Square 303, which may be an advantage to ships having a very Wly. course, but it does not seem worth while to go out of the way to get them.

JUNE.

Barometer.—The isobars (see the lower right-hand corner of the Chart) show that the highest pressure is now in the S.En. corner of the square, whilst the lowest is on its Wn. side and in the N.En. corner.

The highest mean pressure in the lateral strips (30·007) is still between 9° and 10° N., whilst the lowest (29·985) is between 4° and 5° N. It only amounts to 29·986 between 5° and 6° N. From 4° N. to the Equator it gradually increases to 30·006. Pressure has increased generally since May, the greatest increase (·060) being between 0° and 2° N. the least (·010) between 9° and 10° N.

The mean of the means in the lateral strips (29·997), compared with that for May, shows that the Mean Pressure for the whole square has increased ·033, which is the greatest monthly *increase* for the year; we have already noticed how the most of this increase took place in the Sn. part of the square. In October it will be found that there has been as great a monthly *decrease*. The mean pressures in the vertical strips compared with those for May show that the increase of pressure has been decidedly greater in the Wn. than in the En. half of the square.

Air Temperature.—A comparison of the air isotherms with those for May shows an increase of temperature in the N. and decrease in the S. The lateral strips show the change to be +1·5 between 9° and 10° N., +0·9 between 8° and 9° N., −0·2 between 7° and 8° N.; from 7° to 3° N. the average change is nearly −0·4; between 2° and 3° N. it is −0·6, between 1° and 2° N. −1·3, between 0° and 1° N. −1·7, showing how the effect of the Nn. summer is felt in the Nn., and that of the Sn. winter in the Sn. part of the square; also how the effect of the Sn. winter is advancing to the Nd.; for in May the temperature had decreased up to 6° N., whilst in June the decrease extends to 8° N. The Mean Temperature of the whole square (79°·0) has decreased 0·3 since May, but this is the mean result of an increase in the Nn. and decrease in the Sn. part of the square.

Dry and Damp Bulbs.—The least mean difference between dry and damp bulbs (3°·2) is between 6° and 8° N., where there is also the largest percentage of rain and lowest force of wind. The difference increases to 3°·7 between 9° and 10° N. and to 3°·9 between 2° and 3° N. From 2° N. the difference decreases as you go to the Sd. and it only amounts to 3°·5 between 0° and 1° N. This seems remarkable, as there is the smallest percentage of cloud and 96% of steady S.E. Trade there; but it will be seen that there is a large percentage of mist and dew, whilst it is notorious with seamen that at this season there is a damp hazy atmosphere with but little cloud over the cold water in the Sn. part of the square. The vertical strips show that the air temperature has decreased more on the En. than on the Wn. side of the square since May, and that it is now cooler and damper on the En. than on the Wn. side. The mean difference for the whole square (3°·5) shows no change since May.

Sea Temperature.—The isotherms of sea temperature still agree remarkably with those of the air, and keep about 1° higher. The lateral strips show that there has been an increase in the temperature of the sea since May between 6° and 10° N.; between 6° and 7° N. it is +0·2, whilst between 8° and 10° N. it is +1·7. From 6° N. to the Equator it has decreased; the change is −0·1 between 5° and 6° N., gradually increasing to −2°·2 between 0° and 1° N.; so that whilst the decrease in the temperature of the air has extended from 6° to 8° N. since May, that of the sea has only extended from 4° to 6° N., thus keeping 2° behind the air in its changes. The greatest decrease has again been in the S.En. corner of the square. The Mean Temperature of the whole square (80°·1) shows a decrease of 0·3 since May, the same amount as in the case of the air. The vertical strips show that the temperature of the sea, like that of the air, has decreased more on the En. than on the Wn. side of the square.

Specific Gravity.—The lowest specific gravity (1·0264) is between 6° and 8° N., where there is also the most rain and least wind. It increases to 1·0270 between 9° and 10° N. and to 1·0269 between 0° and 1° N. The Mean for the square (1·0267) shows a decrease of ·0001 since May; the lateral strips show that the decrease is confined to the Nn. half of the square, and that there has been a slight *increase* in the Sn. half. The vertical strips show that the specific gravity of the Wn. is greater than that of the En. half of the square, and that the decrease has been much greater on its En. than on its Wn. side. Where there has been the greatest decrease of specific gravity there has been the greatest increase of rain, showing their near relation.

WIND.

TABLE 1.—LATERAL STRIPS.

Lateral Strips. 10° of Longitude by 1° of Latitude.	No. of Observations.	Mean Force of Strip.	N. to E. by N. or N.Ey.		E. to S. by E. or S.Ey.		S. to W. by S. or S.Wy.		W. to N. by W. or N.Wy.		Variables.		Calms.	Prevailing Wind.		Strongest Wind.*	
			%	Mean Force.	%	Mean Force.	%	Mean Force.	%	Mean Force.	%	Mean Force.	%	No. of Observations. Direction.	Mean Force.	No. of Observations. Direction.	Mean Force.
9° to 10° N.	429	2·7	66	3·2	7	3·3	3	2·8	12	2·3	4	1·6	8	N.N.E. ⁵⁴	3·2	S.E. ²	4·5
8° - 9° N.	494	2·5	48	3·1	10	2·4	12	2·6	12	2·5	8	2·0	10	N.E. by N. ⁵⁰	3·4	N.E. by N. ⁵⁰	3·4
7° - 8° N.	623	2·1	29	2·9	17	2·6	15	2·3	12	2·3	13	1·6	14	N.E. by N. ³⁵	3·2	N.E. by N. ³⁵	3·2
6° - 7° N.	615	2·1	21	2·6	27	2·7	18	2·6	8	1·7	11	2·2	15	S. ³⁵	2·6	S. by W. ²¹	3·1
5° - 6° N.	521	2·5	12	2·7	47	3·1	18	2·9	2	2·3	9	2·0	12	S. by E. ⁵²	3·3	S.W. by S. ¹³	3·8
4° - 5° N.	465	2·8	5	2·7	63	3·4	17	2·7	2	1·7	4	2·1	9	S.E. by S. ⁷¹	3·3	W. by S. ¹	4·0
3° - 4° N.	368	3·4	3	2·6	75	3·8	11	3·0	1	2·0	6	2·2	4	S.S.E. ⁷⁷	3·9	E. by S. ⁷	4·4
2° - 3° N.	257	4·0	1	3·1	89	4·1	8	3·2	—	—	2	1·9	—	S.E. by S. ⁵⁷	4·2	S.S.E. ⁵⁰	4·4
1° - 2° N.	249	4·2	3	4·0	95	4·2	1	4·1	—	—	1	2·5	—	S.E. by S. ⁶⁰	4·4	S.E. by S. ⁶⁰	4·4
0° - 1° N.	219	4·1	3	3·8	96	4·1	1	4·0	—	—	—	—	—	S.E. by S. ⁵¹	4·1	S.E. by E. ⁴³	4·3

* In recording the Strongest Wind in a Strip, weight has been given to the number of observations; otherwise the direction and force of a single squall would frequently appear in this column.

TABLE 2.—VERTICAL STRIPS.

Vertical Strips. 10° of Latitude by 1° of Longitude.	No. of Observa- tions.	Mean Force of Strip.	N. to E. by N. or N.E. by.		E. to S. by E. or S.E. by.		S. to W. by S. or S.W. by.		W. to N. by W. or N.W. by.		Variables.		Calms.	Prevailing Wind.		Strongest Wind.*	
			%	Mean Force.	%	Mean Force.	%	Mean Force.	%	Mean Force.	%	Mean Force.		No. of Observations.	Mean Force.	No. of Observations.	Mean Force.
														Direction.		Direction.	
20° to 21° W.	142	3.3	4	3.1	48	3.6	33	3.2	10	2.8	3	2.3	2	S. by E. ¹⁸	3.6	E. by S. ⁶	4.2
21° - 22° W.	232	2.7	9	2.2	41	3.9	18	2.7	14	2.2	6	2.1	12	S.S.E. ³⁰	3.8	E.S.E. ¹	4.5
22° - 23° W.	367	2.6	19	2.6	44	3.6	13	2.4	6	1.9	5	1.9	13	S.S.E. ⁴³	3.7	S.E. ²⁹	4.0
23° - 24° W.	500	2.9	16	2.7	49	3.6	16	2.7	6	2.2	6	2.2	7	S.E. by S. ⁵²	3.7	S.E. ³⁶	4.0
24° - 25° W.	668	2.5	22	2.6	36	3.4	16	2.4	8	2.2	8	1.7	10	S.E. by S. ⁶²	3.7	S.E. by S. ⁶²	3.7
25° - 26° W.	767	2.6	23	2.9	40	3.4	10	2.5	6	2.3	11	2.0	10	S.E. by S. ⁶³	3.8	S.E. by S. ⁶³	3.8
26° - 27° W.	669	2.8	23	3.0	44	3.5	10	2.7	6	2.0	8	1.8	9	S. by E. ⁵²	3.1	S.E. ⁴⁶	3.9
27° - 28° W.	453	3.0	34	3.2	42	3.6	8	2.9	3	2.1	5	1.9	8	S.E. by S. ⁴⁶	4.0	S.E. by S. ⁴⁶	4.0
28° - 29° W.	285	3.3	30	3.6	52	3.6	7	3.1	1	2.8	6	2.3	4	S.E. by S. ⁴⁸	3.7	W.S.W. ²	4.5
29° - 30° W.	157	3.5	34	3.7	53	3.6	4	3.8	1	2.5	4	2.5	4	S.E. ²⁵	3.8	S.S.E. ⁵	4.6

By comparing the means of the percentages in the *lateral* strips (Table 1) with those for May the following result is obtained for the whole square:—

N.Ely. wind 19 % and decreased 26 % since May.	N.Wly. wind 5 % and decreased 3 % since May.
S.Ely. " 53 " and increased 25 " "	Variables 6 " and no change " "
S.Wly. " 10 " " 3 " "	Calms 7 " and increased 1 " "

Between 4° and 9° N. there is 40% less N.Ely. wind since May, whilst between 0° and 6° N. S.Ely. winds have increased more than 30%.

The mean of the mean forces of the 10 strips in Table 1 is 3.0, which, compared with that for May, shows scarcely any change, but by comparing the means for each strip it is shown that there has been a very decided *increase* in the mean force of all winds from 0° to 5° N., and a decided *decrease* from 5° to 10° N. A further comparison shows that the increase between 0° and 5° N. is due to the greatly increased force of the S.E. Trade and smaller percentage of calm there; whilst the decrease between 5° and 10° N. is chiefly due to the decreased force of the N.E. Trade and a larger percentage of calm.

The prevailing-wind-arrows in the small Diagram on the lower right-hand corner of the Chart show that the Nly. wind is still stronger and more Ely. in the N.Wn. corner of the square than on its En. side; also that it extends down to 6° N. on the Wn. side of the square, and only to 8° N. on the En. side. The Remarks in Table 3 support this fact, for the second figures in the numbers of the sub-squares show that to the Sd. of 7° N., the Sn. limit of the N.E. Trade, was only met with to the Westward of 26° W. The wind arrows also show that the prevailing S.Ely. wind gradually veers from S.E. near the Equator to South between 6° and 8° N. Table 2 shows that N.Wly. and S.Wly. winds are more prevalent on the En. than on the Wn. side of the square: this is shown very clearly by the vertical strips of the published Chart.

* In recording the Strongest Wind in a Strip, weight has been given to the number of observations; otherwise the direction and force of a single squall would frequently appear in this column.

TABLE 3.

Latitude.	s.-s.	Winds, Force 7 or upwards, but not Squalls.	Direction of Squalls and Heavy Squalls. (All Squalls Force 7 or upwards are considered to be heavy.) (All Squalls on either side of N., S., E., or W., are given to their re- spective quarters, so that there are fewer from the above-named points than from the quarters.)								s.-s.	REMARKS. NOTE. A bar, thus —, separates the Remarks from different Logs. The dates of Trade limits are in the order of the sub-squares in which they occurred, beginning with the most Eastern one.						
			N.	N.E.	E.	S.E.	S.	S.W.	W.	N.W.								
			Heavy.	Heavy.	Heavy.	Heavy.	Heavy.	Heavy.	Heavy.	Heavy.								
9° to 10° N.	—	- - -	-	-	-	-	2	1	-	-	2	-	-	-	1	-	92 96	Sn. limit of N.E. Trade, 15th. Sudden shift of wind from N.E. to S. by E.— A ship passed within a mile, carrying all sail with a steady N.E. wind, while we had it twice round the compass.
8° - 9° N.	—	- - -	-	-	-	2	-	2	2	-	-	1	-	-	-	-	97 99 83to87	Wind gusty. A squall, force 7 (no direction given). Sn. limit of N.E. Trade, 15th, 17th, 11th, 23rd, 24th, 15th, 19th.
																	80	Violent squall commencing at E.N.E., force 9 to 10, and shifting suddenly to E.S.E. 10, and S.S.E. 9. It lasted 2 hours.
																	83	15th, 1860. Heavy S.Ely. squall, force 8; carried away F. T. Gt. mast and split several sails, after which it gradually shifted to N.E. and settled into a steady N.E. Trade.— 17, 1859. Squall in which Nly. wind flew to S.E. with heavy rain.
																	84	Sudden shift of wind from N.E. to S.E., in a heavy squall, with t., vivid l., and heavy r.— Shift of wind from N.E. to S.W. (2 entries.)
																	87	Heavy rain, followed by heavy squall from S.E. veering to S. b. W.
7° - 8° N.	—	- - -	-	-	-	1	2	-	-	1	-	1	-	-	-	1	74to77	Sn. limit of N.E. Trade, 24th, 12th, 19th, 20th, 12th, 18th.
																	74	Lost the N.E. Trade, wind working suddenly round to S. coming from a heavy bank of clouds.
6° - 7° N.	—	- - -	-	-	-	-	-	-	2	2	1	-	-	1	-	1	66to69	Sn. limit of N.E. Trade, 1st, 7th, 11th.
																	61	Squalls from E.S.E., force 7, with heavy arched nim. similar to Tornadoes, of short duration and with little rain.
																	63	Sudden shift of wind from S.S.E. to N.E.— Threatening squalls with heavy r, but not much wind.
																	64	Heavy S. b. W. squall, wind in hot gusts like the Northers at Sydney.—Wind shifted sud- denly from S.E. to S.S.W.
																	65	Blowing strong from S.E. with intervals nearly calm.—Squally from all points.—Wind from all directions.
																	66	30th. I am in these variables a horrid time, wind flying all round in an hour. Sudden shift of wind from S.W. to E.
																	67	Puffs.
5° - 6° N.	56	S. 7	-	-	-	2	2	-	-	5	1	-	-	-	-	1	56&57 52to58	Sn. limit of N.E. Trade, 2nd, 14th. Nn. limit of S.E. Trade, 1st, 10th, 6th, 21st, 17th, 16th, 23d.
																	51	Most terrific squall of wind, with tremendous rain, thunder, and lightning: the most furious I ever experienced in these latitudes. (Direction not specially given. In wind column N.E.)
																	52	Calms and fresh breezes alternating. Wind flying from W.N.W. to S.
																	53	A sudden strong gust from S.E., which lasted a few minutes, then back to S.W.
																	56	Wind shifting from all points of the compass in smart gusts.
																	57	16th. Passed from S.E. to N.E. Trade without calm. —Squalls from all points.—Wind puffy.

TABLE 3—continued.

Latitude.	s.-s.	Winds, Force 7 or upwards, but not Squalls.	Direction of Squalls and Heavy Squalls. (All Squalls Force 7 or upwards are considered to be heavy.) (All Squalls on either side of N., S., E., or W., are given to their respective quarters, so that there are fewer from the above-named points than from the quarters.)								s. s.	REMARKS. NOTE. A bar, thus —, separates the Remarks from different Logs. The dates of Trade limits are in the order of the sub-squares in which they occurred, beginning with the most Eastern one.							
			N.	N.E.	E.	S.E.	S.	S.W.	W.	N.W.									
			Heavy.	Heavy.	Heavy.	Heavy.	Heavy.	Heavy.	Heavy.	Heavy.									
4° to 5° N.	—	- - -	-	-	1	1	-	-	7	1	3	-	-	1	-	-	-	40 to 49	Nn. limit of S.E. Trade, 1st, 28th, 3rd, 9th. Wind shifted very suddenly in a smart squall from S. to W.S.W. 41 Sudden shift of wind from S.S.E. to N.N.W. 45 Vble. S.Ely. breeze and squally, force 5 to 6 (5 entries). 46 Squally puffs of wind shifting rapidly from all points of the compass for an hour.— Squally wind, shifting continually, with heavy rain. 47 Sharp squall, veering wind from S.E. to W. b. S. 49 N.Ely. breeze, fitful and unsteady. 30 to 38 Nn. limit of S.E. Trade, 10th, 6th, 26th, 1st, 13th, 20th. 35 Heavy squall veering round the compass.— Wind shifted from S. to N. b. W. in a squall, with tremendous heavy rain, which lasted 7 hours. A very heavy squall from S.E. b. S. — Wind N.W. b. W. to N.E. b. N., force 7, squally. 24 Light variable winds. 25 " " 28 Calm and variable.—Wind from S. to W. 29 Wind N.W. to West. 10 Heavy squalls from N.N.E. during last 24 hrs., succeeded by light airs from S.S.E. and S.S.W. without calm. (Ship from the Sd.) 17 Wind very irregular. Intervening calms. 18 Wind variable from S. to W. 07 Nn. limit of S.E. Trade, 2nd. 03 Unsteady wind with a splendid Trade sky; wind S.S.Ely.
3° - 4° N.	31	S.S.E. 7	-	-	-	-	-	-	3	-	-	-	1	-	-	-	-	30 to 38	
2° - 3° N.	22 27	S.S.E. 7 S.S.E. 7 to 8.	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	24 25 28	
1° - 2° N.	12	S.E. vble. 8, & puffy.	-	-	-	1	-	-	1	-	-	-	-	-	-	-	-	10	
	13	S.S.E. vble. 7.	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	17	
0° - 1° N.	18 03 08	S.E. 5 to 7 S.S.E. 7 S.E. b. S. 5 to 7	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	18 07 03	
Sum	-	9, all S.Ely.	-	-	3	7	2	-	19	11	4	1	2	4	-	-	4	1	

NOTE.—The strong S.Ely. winds of force 7 or upwards, were pretty equally divided between the En. and Wn. sides of the square.

Most of the N.Ely. squalls were on the En. side of the square.

" S.Ely. " " Wn. "

There were 14 heavy squalls on the En., and 10 on the Wn. side of the square.

Table 3 shows nine entries of wind force 7 or upwards, and all were S.Ely. There were 15 squalls from some Nly., and 41 from some Sly. direction. The Remarks in Table 3 show that sudden changes of wind were very common in June. They also speak of some very severe squalls, especially in s.-ss. 80 and 51.

CURRENTS.

TABLE 4.—LATERAL STRIPS.

Lateral Strips. 10° of Longitude by 1° of Latitude.	No. of Observa- tions.	Mean Rate.	N. to E. by N. or N.Ely.		E. to S. by E. or S.Ely.		S. to W. by S. or S.Wly.		W. to N. by W. or N.Wly.		None.	Prevailing Current.		Strongest Current.*	
			%	Mean Rate.	%	Mean Rate.	%	Mean Rate.	%	Mean Rate.		No. of Observations.	Mean Rate.	Direction.	Rate.
9° to 10° N.	69	11	10	11	6	13	39	15	19	15	26	W. by S.	13	S.W. by W.	41
8° - 9° N.	61	12	10	14	18	15	34	18	8	18	30	W.S.W.	17	S.S.W.	37
7° - 8° N.	59	11	10	18	27	18	12	15	22	13	29	S.E.	18	E.S.E.	31
6° - 7° N.	60	17	35	22	33	21	12	17	3	16	17	E.	22	N.E.	57
5° - 6° N.	50	18	36	18	30	25	10	18	10	20	14	E.	29	E.	37
4° - 5° N.	62	19	50	22	21	20	5	14	14	19	10	E. by N.	26	E. by N.	48
3° - 4° N.	45	17	16	24	11	18	11	24	40	21	22	N.W.	22	W.	56
2° - 3° N.	48	25	2	9	—	—	35	27	50	31	13	W.	34	W.	55
1° - 2° N.	54	31	2	15	—	—	37	31	61	31	—	W.	30	W. by S.	66
0° - 1° N.	38	27	3	19	—	—	29	30	68	26	—	W. by N.	31	S.W. by W.	60

TABLE 5.—VERTICAL STRIPS.

Vertical Strips. 10° of Latitude by 1° of Longitude.	No. of Observa- tions.	Mean Rate.	N. to E. by N. or N.Ely.		E. to S. by E. or S.Ely.		S. to W. by S. or S.Wly.		W. to N. by W. or N.Wly.		None.	Prevailing Current.		Strongest Current.*	
			%	Mean Rate.	%	Mean Rate.	%	Mean Rate.	%	Mean Rate.		No. of Observations.	Mean Rate.	Direction.	Rate.
20° to 21° W.	17	22	24	30	23	14	—	—	41	28	12	W.N.W.	35	W.N.W.	41
21° - 22° W.	24	16	21	28	8	19	17	14	29	20	25	W. by N.	23	N.E.	57
22° - 23° W.	54	16	15	23	18	19	17	19	26	25	24	W. by N.	32	N.E. by N.	57
23° - 24° W.	61	16	20	15	26	21	16	20	23	26	15	E.	26	W.N.W.	59
24° - 25° W.	75	21	21	19	26	17	36	24	12	29	5	W. by S.	38	W.N.W.	60
25° - 26° W.	99	16	18	17	18	22	25	17	21	23	18	E.	26	N.W. by W.	53
26° - 27° W.	83	16	16	17	8	23	19	23	33	23	24	W. by N.	29	W. by N.	61
27° - 28° W.	57	21	24	21	9	21	32	28	19	25	16	W.S.W.	24	W. by S.	66
28° - 29° W.	41	19	12	28	7	17	12	24	54	21	15	W. by N.	23	N.E. by N.	45
29° - 30° W.	35	21	11	23	—	—	29	18	46	28	14	W.	27	W.	55

* The Strongest Current in each Strip is here given, as it is important to the Navigator to know the extreme to which he is liable.

Table 4 shows that N.Wly. currents prevail from 0° to 4° N., N.Ely. from 4° to 7° N., S.Ely. from 7° to 8° N., and S.Wly. from 8° to 10° N. Between 1° and 3° N. the average speed of the N.Wly. current is 31 miles in the 24 hours. Where the N.Ely. and S.Ely. currents prevail their average speed is about 20 miles in the 24 hours, whilst that of the prevailing S.Wly., in the Nn. part of the Square, is only about 17 miles.

A glance at the Diagrams on the lower right-hand corners of the Charts shows that the amount of Ely. current has increased very much since May, and that it lies between the strong Wly. current due to the S.E. Trade, and the weaker S.Wly. current due to the N.E. Trade; also that it has an even temperature of somewhat over 80°.

Table 5 and the En. and Wn. strips of the Chart show that there is more Ely. current on the En. than on the Wn. side of the square. With Wly. currents this order is reversed.

The Remarks on Currents agree with the Chart in showing that there was very much more Ely. than Wly. current between 4° and 8° N.

Current rips were most frequently seen between 6° and 8° N., where they were also very heavy. Heavy rips were four times as frequent on the En. as on the Wn. side of the square. Hence they seem to have been most frequent and strongest where the Ely. current was displacing the Wly.

The following remarks have been extracted from various logs:—

Latitude.	Sub-square.	Remarks on Currents. NOTE. A bar, thus —, separates the Remarks from different Logs.
7° to 8° N.	74	Water has a very disturbed appearance, very like a boiling caldron.—Strong ripple about the ship noisiest on the western side.
6° - 7° N.	64	Sea like a boiling caldron.
5° - 6° N.	50	Strong tide rushes at times.
	58	Sea like the meeting of strong tides.
4° - 5° N.	40	Water bubbling and making a great noise.
	43	Slight ripples running Nd.
	45	A belt of froth about 30 ft. broad running N.E. and S.W. as far as the eye could see, with strong ripple on each side. On trying sea temp. at 40 fathoms, apparently a strong under current taking thermometer to the N.Ed.; there was no wind at the time.
	49	By boat found current setting to the N.Ed. 1½ knots per hour.
3° - 4° N.	39	Never before experienced so much N.Ely. current (N. 23° E. 44 miles in 24 hours, ship from Nd.).
1° - 2° N.	10	Strong rushes of current.
	14	Passed through two tide rips, water quite smooth in them, they had no effect on steerage or sea temperature.
	17	Passed a rip stretching N. by W. and S. by E., and going W. by S.; wind E. by S.—Dreadful current S. 75° W. 66 miles in 24 hours.
0° - 1° N.	03	Experienced a set of 338 miles to the Wd. between the 19th and 30th, 1862, during a run from 1° 55' N. and 0° 41' E. to 0° 40' N. and 23 45' W.

SEA.

The sea was remarked on as “luminous” 32 times; 22 of the remarks were made between 2° and 7° N.; 16 were “very luminous;” of these 15 were between 2° and 7° N. 18 of the 32 were on the En. side of the square: only 4 were recorded between 2° and 3° N., and they were all on the Wn. side.

The sea was recorded as “deep blue” 9 times, 3 between 9° and 10° N., the rest equally distributed. It was only recorded as “green” once, which was in s.-s. 09. See the remark for that s.-s.

Latitude.	Sub-square.	Remarks on Sea. NOTE. A bar, thus —, separates the Remarks from different Logs.
7° to 8° N.	75	Specific gravity remarkably less, reading now 1·0252, whilst one degree to the Nd. it was 1·0279. (The ship had passed from the Wly. to the Ely. current.)
5° - 6° N.	52	Sea one mass of fire as far as eye can reach, different from what I have ever seen before in my experience of 22 years.
	53	Sea luminous all round.
	57	Specific gravity at 12 feet 1·0269, temp. 81°, at surface 1·0264 temp. 81°.
4° - 5° N.	43	Sea one mass of fire as far as the eye can reach. Have never seen the sea in such a state (from same log as the remark in s.-s. 52, but another night. The ship was probably where the Ely. and Wly. currents met.)
3° - 4° N.	32	Sea very luminous, like a sheet of flame.—Sea as if on fire.
2° - 3° N.	24	Water very thick.
1° - 2° N.	16	do. do.
	17	Water a lighter colour than usual.
0° - 1° N.	05	At 9 a.m. 27th, 1867, passed within half a mile of a piece of broken water of about 200 yards circumference, rough and broken at the edge, but smooth as oil in the centre. The colour appeared darker than the surrounding sea. It was below the surface as the sea rose and fell on it. Our boats being smashed off Algoa Bay I could not visit and ascertain what it was, for which I am very sorry. The wind would not allow us to go any nearer. I cannot imagine what it was unless one of those volcanic shoals of this region. Good observations place it in lat. 0° 27' N. and longitude 25° 31' 45" W.
	09	Water very luminous, large globules like balls of fire flashing up at times.—Water of a greenish hue. Remarkable fall in surface temperature from 78° to 75° (ship going south). NOTE.—The sudden fall in the temperature probably caused the dew or damp haze which gives a greenish tinge to the sea when seen through it.

The Eastern and Western strips of the published Chart show that throughout the square swell from some Sn. quarter prevails over that from some Nn.; the difference, however, is somewhat less marked in the Wn. than in the En. half of square: the one degree data show an excess of Nly. swell between 9° and 10° N. on the Wn. side of the square, just where the wind-arrows show that for some months Nly. winds have been so much stronger than in other parts of the square.

CLOUDS.

TABLE 6.—LATERAL STRIPS.

PERCENTAGE of each FORM, and MEAN AMOUNT of all CLOUDS.

Lateral Strips. 10° of Longitude by 1° of Latitude.	No. of Observa- tions.	Upper Clouds.			Lower Clouds.				Amount, 10 being "Com- pletely Clouded."	
		Cir.	Cir.-c.	Cir.-s.	Cum.	Cum.-s.	Str.	Nim.		
		%	%	%	%	%	%	%	No. of Obs.	Mean.
9° to 10° N. -	253	17	15	7	49	13	13	17	327	5.3
8° - 9° N. -	276	9	16	8	42	17	11	34	373	6.2
7° - 8° N. -	364	11	12	10	37	15	12	46	455	6.8
6° - 7° N. -	339	8	12	5	34	17	11	44	445	6.9
5° - 6° N. -	306	8	15	6	40	16	11	38	363	6.8
4° - 5° N. -	263	10	17	8	44	14	13	31	336	6.4
3° - 4° N. -	217	10	20	5	47	11	14	27	276	5.7
2° - 3° N. -	167	10	20	5	55	15	7	13	208	4.8
1° - 2° N. -	155	10	15	8	66	8	8	6	190	3.9
0° - 1° N. -	125	19	21	4	60	4	12	5	159	3.5

TABLE 7.—VERTICAL STRIPS.

PERCENTAGES of each FORM, and MEAN AMOUNT of all CLOUDS.

Vertical Strips. 10° of Latitude by 1° of Longitude.	No. of Observa- tions.	Upper Clouds.			Lower Clouds.				Amount, 10 being "Com- pletely Clouded."	
		Cir.	Cir.-c.	Cir.-s.	Cum.	Cum.-s.	Str.	Nim.		
		%	%	%	%	%	%	%	No. of Obs.	Mean.
20° to 21° W. -	59	3	7	3	34	15	12	41	103	5.9
21° - 22° W. -	136	10	13	7	30	10	13	41	187	6.8
22° - 23° W. -	220	8	20	6	35	15	14	32	260	6.5
23° - 24° W. -	274	7	16	5	49	11	7	30	396	5.9
24° - 25° W. -	366	11	13	4	42	14	11	28	498	6.3
25° - 26° W. -	427	13	14	8	44	15	10	32	561	6.3
26° - 27° W. -	419	12	18	8	49	16	10	30	484	5.8
27° - 28° W. -	300	14	16	8	50	17	15	30	316	5.5
28° - 29° W. -	183	9	18	9	49	14	14	25	213	5.1
29° - 30° W. -	81	5	19	9	52	4	17	17	114	4.6

The mean of the means in the 10 strips of Table 6 shows that the Mean Amount of Cloud for the whole square is about 5.6, or 0.4 less than in May. By comparing the amounts in the various strips it is shown that there has been an increase between 6° and 10° N., and a decrease between 0° and 6° N. The greatest increase (1.5) is between 7° and 8° N., whilst the greatest decrease (1.9) is between 1° and 2° N. These facts point to the Nn. progress of the Doldrum, which is shown by the wind and other data to be between 6° and 8° N., where there is also the largest Amount of Cloud, viz., 6.9, the smallest Amount (3.5) being between 0° and 1° N.

The percentage of Nimbus has increased in the Nn., and decreased in the Sn. half of the square, the increase amounting to 32% between 7° and 8° N., whilst the decrease amounts to 21% between 2° and 3° N. The mean for the square (26%) shows an increase of 3% since May.

Table 7, when compared with that for May, shows a very decided decrease in the Amount of Cloud between 26° and 30° W., whilst it has increased between 20° and 26° W.

The amount of Nim. has also very decidedly increased between 20° and 26° W., whilst it has decreased between 28° and 30° W.

TABLE 8.

The following Table is derived from the Remarks on Clouds in June :—

NOTE.—All cloud entries from N. to E. b. N. inclusive have been given to the N.En. quarter.
" E. b. S. to S. " S.En. "
" S. b. W. to W. b. S. " S.Wn. "
" W. b. N. to N. b. W. " N.Wn. "
Upper clouds from E. or W. are extracted in the Remarks. Lower clouds flying with the wind are not recorded.

Quarters from which the Clouds and Wind came.		Lower Clouds.			Clouds (doubtful whether upper or lower).			Upper Clouds.		
Clouds from.	Wind from.	Total No. of Observa- tions.	No. in Nn. half of Square.	No. in Sn. half of Square.	Total No. of Observa- tions.	No. in Nn. half of Square.	No. in Sn. half of Square.	Total No. of Observa- tions.	No. in Nn. half of Square.	No. in Sn. half of Square.
N.En.	N.En.	—	—	—	1	1	—	5	5	—
"	S.En.	4	1	3	11	4	7	35	7	28
"	S.Wn.	—	—	—	1	1	—	5	1	4
"	N.Wn.	—	—	—	1	—	1	—	—	—
"	N.	—	—	—	1	1	—	—	—	—
"	S.	1	1	—	—	—	—	5	4	1
"	E.	—	—	—	1	1	—	1	1	—
		5	2	3	16	8	8	51	18	33
S.En.	N.En.	2	2	—	14	14	—	14	14	—
"	S.En.	—	—	—	—	—	—	27	7	20
"	S.Wn.	—	—	—	3	3	—	5	1	4
"	N.Wn.	1	1	—	3	2	1	5	4	1
"	N.	—	—	—	3	2	1	—	—	—
"	S.	—	—	—	2	2	—	5	4	1
"	E.	2	2	—	1	—	1	2	2	—
		5	5	—	26	23	3	58	32	26
S.Wn.	N.En.	1	1	—	3	3	—	8	8	—
"	S.En.	1	1	—	3	3	—	3	2	1
"	N.Wn.	—	—	—	3	3	—	—	—	—
"	S.	—	—	—	1	1	—	—	—	—
"	E.	—	—	—	4	4	—	—	—	—
"	W.	—	—	—	1	1	—	—	—	—
		2	2	—	15	15	—	11	10	1
N.Wn.	N.En.	1	1	—	2	2	—	2	2	—
"	S.En.	—	—	—	5	1	4	5	2	3
"	S.Wn.	—	—	—	2	1	1	—	—	—
"	E.	—	—	—	2	2	—	1	1	—
		1	1	—	11	6	5	8	5	3

NOTE.—The following are the percentages of upper clouds from the various quarters, 128 being the total number of observations.
From the N.En. quarter 40%, being + 12% since May.
" S.En. " 45 " " - 13 " "
" S.Wn. " 9 " " - 1 " "
" N.Wn. " 6 " " + 2 " "

The number of observations on the motion of upper clouds has increased very decidedly in the Nn. half of the square since May; in the Sn. half it remains the same. This is rather remarkable as the amount of cloud and especially of nimbus has increased very much in the Nn. half of the square, and decreased in the Sn. In the Nn. half of the square the largest number of upper clouds was from the S.En. quarter, wind N.Ely., in the Sn. half the largest number was from the N.En. quarter, wind S.Ely. The eight entries of upper clouds from the S.Wd., wind N.Ely., were all between 8° and 10° N.; it will be seen that nearly all entries of clouds from the S.Wd. were in the Nn. half of the square, indicating how they gradually turn from S.E. to S.W. as they go to the Nd.

The following remarks have been extracted from various logs:—

Latitude.	Sub-square.	Remarks on Clouds. NOTE. A bar, thus —, separates the Remarks from different Logs.
9° to 10° N.	93	Cir.-c. from N.E., no wind.*
	94	Clouds of all descriptions; lower from Sd., wind N.E.—Clouds from S.W. by S., no wind.—Clouds from S., wind N. by E.
	95	Upper clouds fast from S.S.W., no wind.
	96	Cir. from E., wind N.N.E.
	97	Clouds have a smart motion from both N. and S., wind N.E. 4.—Clouds fast from Sd., wind Ely.
8° - 9° N.	98	Cir.-c. stationary, wind N.E. by N.
	82	Heavy cum. all round horizon about 7° high; overhead very clear.
	84	Clouds from N.E. by E., no wind.—Clouds from N.E. by N. and N.W. by W., wind variable.
	86	Heavy clouds rising in S. by W. and passing to the northward, wind N.E. by N.—Bands of feathery cir. lying N.N.W. and S.S.E., stems to the S.S.E., wind E.N.E.
7° - 8° N.	87	A concatenation of all sorts of clouds changing every hour.
	72	Clouds from N.N.E., no wind.
	73	Nim. from W. and S.W., wind E.N.E.
	74	Lower clouds from W., wind S.Wly.
	75	Cir. from E. b. N., no wind.—Cir. from S.W. by S., no wind.—Clouds from S. by E. no wind.
6° - 7° N.	76	Upper clouds from S.E., lower from N.E., wind variable.—Very high small cir. from E., wind E.N.E.
	77	Clouds from Sd., wind N.Ely.
	60	Clouds from N.N.E., E.S.E., and S., wind S. by E. Clouds from E.S.E. and S.S.W., wind S. by E.
	61	Clouds fast from S.S.E., wind N.Wly., 1 to 2. Clouds from S.E. at a moderate rate, wind W.S.W., 1.
	62	Lower clouds from N.N.W., wind W. by N.
5° - 6° N.	64	Clouds from S. by E., wind E.S.E. (4 entries). Clouds from S.Wd., no wind.—All kinds of cir. from Ed., cum. from W.S.W., wind, S.S.E.—Clouds not so towering nor so bold as yesterday (Ship from Nd.).—Clouds from S. by W., no wind.—Upper clouds from E.S.E. and W.S.W., wind S.
	65	Cir.-s. from E., no wind.
	66	Clouds fast from E. by N., variable wind (2 entries).
	67	Heavy masses of cum. hanging stationary all round horizon, like rugged islands covered with snow.—Cir.-c. from S., no wind.
	69	Clouds from S.Ed., no wind.
	51	Light white thin str. fast from N.N.E., heavy masses of squally looking clouds gathering to S.Ed. Clouds from S.S.W., N.N.E., and E. Clouds broke, going in all directions. Clouds from E.N.E. and S.S.E., wind Sly.
	53	Clouds from Ed., wind S.Ely.—Cir.-c. from N.Ed., cir.-s. from S.Wd., wind S.Wly.
	55	Cir. from S.Ed., cum. from E.N.E., wind S.Ely. Upper clouds from S.Ed., lower from Ed., no wind. Heavy towering cum.
	56	Large masses of nim. round horizon, no wind.—Delicate lines of cir. from the Ed., very high, wind S.Ely.
	57	Cir.-c. slowly from E., wind S.S.E., 5.
	58	Cir.-s. from E. by N., wind variable.

* No wind, means that it was calm at the time.

Latitude.	Sub-square.	Remarks on Clouds. NOTE. A bar, thus —, separates the Remarks from different Logs.
4° to 5° N.	42	Heavy nim. piled on N.En. horizon, wind S.E.
	43	Cir.-c. from N.Wd., cum. from Sd., wind W.S.W.—Cir. from S.Ed., no wind* (2 entries).
	44	Clouds from N., no wind.
	45	29th. Towards night clouds began to lose that uniform black wet sickly appearance, and to break into detached clouds (ship from Nd.).—19th. All Nn. horizon filled with dark heavy rain clouds, but pretty clear to the Sd.—Cir.-c. from S. by E., no wind.
	46	Upper clouds from W. by N., lower from S.Wd., no wind.—Clouds with various motions, wind S. by E.
3° - 4° N.	47	Cir.-c. from E., wind S.E. by S.
	48	Clouds fast from Ed., wind S.Ely., 4.
	49	Cir.-c. from S. by E. and E. by N., wind S. by E.
	33	Clouds from S. by E., no wind.
2° - 3° N.	35	Clouds from various Nly. points, wind S.S.E.
	36	All kinds of cir. from N.Ed., wind E.S.E. (2 entries).
	24	Clouds from various Nly. points, wind S.S.E.
	26	Cum. from N. by W., wind S. by E. All kinds of cir. from N.E. by E., wind E.S.E.
1° - 2° N.	29	Upper clouds from S.Ed., lower from N.Wd., wind S.E. Cir.-s. from S.E. by S., lower clouds from W. by N., wind S.W. by W.
0° - 1° N.	15	Cir.-c. moving slowly from N. by W., wind S.Ely.
	02	Cir.-c. appear stationary, cum. from W. by N., wind S. by E.
	03	Clouds from S.S.W. and E.S.E., wind S.S.E.
	05	All kinds of cir. from N.E. by E., wind S.E. by E.

* No wind, means that it was calm at the time.

WEATHER.

TABLE 9.—LATERAL STRIPS.

Lateral Strips, being 10° of Longitude by 1° of Latitude.	Thunder. (t.) %	Lightning. (l.) %	Squalls. (q.) %	Rain. (r.) %	Mist or Haze. (m.) %	Dew. (w.) %
9° to 10° N.	3/4	3	4	8	10	3
8° - 9° N.	2	6	8	20	5	1
7° - 8° N.	3	7	10	28	4	2 1/2
6° - 7° N.	3	10	12	30	2	1 1/6
5° - 6° N.	1	6	14	26	3	1 1/3
4° - 5° N.	2	6	15	23	1	1 1/5
3° - 4° N.	1	5	14	18	2	1
2° - 3° N.	3/4	3	7	8	3	4
1° - 2° N.	—	1 1/3	4	2	8	2
0° - 1° N.	—	1 1/2	1	—	10	5

TABLE 10.—VERTICAL STRIPS.

Vertical Strips, being 10° of Latitude by 1° of Longitude.	Thunder. (t.) %	Lightning. (l.) %	Squalls. (q.) %	Rain. (r.) %	Mist or Haze. (m.) %	Dew. (w.) %
20° to 21° W.	2/3	3	6	15	—	2
21° - 22° W.	2	5	6	23	2	2
22° - 23° W.	2	5	9	22	2	1
23° - 24° W.	2	7	11	22	4	2/3
24° - 25° W.	2	9	9	19	5	1
25° - 26° W.	2	6	10	22	6	2
26° - 27° W.	1	3	10	17	3	2/3
27° - 28° W.	1	3	10	19	6	2
28° - 29° W.	2	6	14	17	5	1
29° - 30° W.	3	4	6	9	6	1

TABLE 11.—LIGHTNING.

This Table gives the bearing on which Lightning was seen in the various Lateral Strips. Only the bearings recorded as actually N., S., E., or W., have been given to those points.

Lateral strips, being 10° of Longitude by 1° of Latitude.	Number of Observa- tions.	N.	N.Ely.	E.	S.Ely.	S.	S.Wly.	W.	N.Wly.	All round	No direction given.
9° to 10° N.	11	—	—	1	4	1	5	—	—	—	—
8° - 9° N.	12	1	1	1	3	2	1	1	1	—	1
7° - 8° N.	15	—	4	3	2	1	1	—	1	2	1
6° - 7° N.	27	2	5	4	3	3	3	—	3	2	2
5° - 6° N.	11	1	4	—	1	1	—	2	—	2	—
4° - 5° N.	7	1	4	1	—	—	1	—	—	—	—
3° - 4° N.	3	—	1	—	—	1	—	—	1	—	—
2° - 3° N.	4	1	2	—	—	—	—	—	—	—	1
1° - 2° N.	1	1	—	—	—	—	—	—	—	—	—
0° - 1° N.	1	—	1	—	—	—	—	—	—	—	—
Total for the month and how distributed -	92	7	22	10	13	9	11	3	6	6	5

The means of the various percentages in Table 9, compared with those for May, show that there has been an increase of rain and decrease of lightning, mist, and dew. By comparing the percentages in the various strips it is shown that thunder, lightning, squalls, and rain have increased in the Nn. part of the square; their greatest increase has been between 7° and 9° N., where there has been a great decrease of dew and the greatest decrease of mist: with squalls the increase has extended down to 3° N. In the Sn. part of the square the order of these changes is reversed, so that thunder, lightning, squalls, and rain have decreased, whilst mist and dew have increased. These facts, taken in connection with the wind data, show that the Doldrum has advanced more than 2° to the Nd. since May.

Between 3° and 9° N. about every twelfth squall was heavy, and there were ten very heavy squalls in the same zone, most of which are alluded to in the Remarks of Table 3. Table 10, compared with that for May, shows a decided increase in the percentage of squalls on the Wn. and decrease on the En. side of the square.

Mist is most abundant in the Nn. and Sn. parts of the square and on its Wn. side; it has greatly increased between 0° and 2° N.; this increase was probably caused by the cooler water coming in from the Sd., for there can be no doubt that in Square 3 mist or haze comes from two causes, viz., moisture in the air over cold water, and dust from land.

Table 11 shows that lightning was most frequently seen on some Sly. bearing between 8° and 10° N., and on some Nly. bearing between 0° and 8° N. The wind data indicate that the Doldrum lay between 6° and 8° N. in June: for instance, in Table 1 it is shown that there was more N.Ely. than S.Ely. wind between 7° and 8° N., whilst between 6° and 7° N. there was more S.Ely. than N.Ely.; hence it may be concluded that the meeting of the winds and source of the lightning was between 6° and 8° N., though the line of their meeting was always advancing to the Nd. It will be noticed that there was much lightning seen to the Ed. between 6° and 8° N., whilst it was chiefly to the S.Ed. further north, and to the N.Ed. further south. There is still much more lightning on Ely. than on Wly. bearings, though there is more seen to the S.Wd. than there was in May.

The following remarks on Weather give the direction in which *certain kinds* of lightning were seen, &c.:

Latitude.	Sub-square.	Remarks on Weather.
NOTE. A bar, thus —, separates the Remarks from different Logs.		
9° to 10° N.	94	Sheet lightning to the S.Wd.—Sun at setting of a sickly white appearance.—Hot and suffocating.—A hot haze in the day time.
	98	Sheet l. in S.E.
	99	Sheet l. in S.E.
8° - 9° N.	80	Very gloomy to the Sd.
	81	A halo round the moon.
	84	"Sun-dog"* in E., 2 hrs. later another in S.S.E.—Hot and suffocating.
	85	Sheet l. to the N.Ed.
	86	Sheet l. in S.E.—Rain per gauge 0·6 in. in 10 hrs.
	88	Bright crimson sky at sunset over the whole heavens.
	89	Sheet l. to Ed.
7° - 8° N.	70	Lightning between E. and N.N.W.
	73	Forked l. to S.E. Forked l. to E.—8 a.m., temperature in sun 95°, shade 80°·7, 10 a.m., in sun 120°, in shade 83°.
	74	Rain per gauge 2·7 ins. in 6 hrs.
	75	Rain per gauge 0·6 in. in 2 hrs.—Constant heavy rain for 8 hours.
	77	Lightning like a gun flash to the Ed., flaring up behind str.
6° - 7° N.	62	3rd, 1863. A very large waterspout about 2 miles off, it formed very suddenly from a dense cloud in the N.N.E., and continued about fifteen minutes. The sea was one mass of foam at its base to about 1° altitude. Water distinctly visible rushing up the column until it entered the opaque part near the cloud.—Sheet l. in the N.E.
	63	Rain per gauge 0·6 in. in 24 hrs.—Unusual scintillating of stars.
	64	Forked l. in S. and forking to N.W.
	65	Sheet l. to N.N.W. and E.N.E.—Much fork and sheet l. all colours, red, white, purple, and blue; perpendicular and horizontal.—Noon Therm. in sun 101°, in shade 83°·7.
	67	Sheet l. and t. in N.W.
5° - 6° N.	50	Fine lunar rainbow to W.—Sheet l. in all quarters.
	51	Sheet l. to Wd.—Amount of rain on night of 11th was 3·68 ins. "I think this the heaviest rain I ever experienced."—Sheet l. in all quarters all night.
	53	Rain per gauge in last 24 hrs., 0·9 in.
	55	Noon temp. in sun shaded from wind 100°·5, in shade 82°.
	56	Tremendous rain.
4° - 5° N.	40	"Never before saw so much rain in the variables; from the way the boats and other things filled, I think 24 ins. under the amount."
	43	Sheet l. to the Ed.
	45	Very dry, clear, and pleasant weather through most part of the day.
	47	9th, 1863. Taken aback with winds from S.E. (previously S.W.) which afterwards veered to S.W., blowing heavily, with sea in awful commotion. This was caused by a waterspout which was just forming to the S.W.; it appeared at first sight like a shoal with the water breaking over it, but soon formed into an immense boiling mass. Wore ship and stood to the Ed. to avoid it. Immediately under the spout was a mass of foam, but it did not appear to be connected with that in the air which was about 50 feet above the surface of the sea. Its rotatory motion not well ascertained. For a short time it appeared to travel to the S.Wd. at the rate of 4 miles or more an hour.
3° - 4° N.	31	Rainfall in 16 hrs. 2·6 ins.
	37	Thunder commenced in the E. and worked through N. to W.
2° - 3° N.	24	Rain per gauge in 24 hrs., 0·7 in.
	27	Stars twinkling very much.
	28	Sheet l. in N.N.E.
1° - 2° N.	10	Amount of rain in 24 hrs., 1·09 ins.
	14	Sheet l. in N. all night.

* Also called by seamen Wind-dog or Wind-gall. It is a prismatic colouring generally seen near the horizon.

GENERAL REMARKS.

The following extracts have been made from the "Remarks" in various logs:—

NATURAL HISTORY.

Latitude.	Sub-square.	Remarks on Natural History.
Land Birds and Insects.		
9° to 10° N.	96	Caught about a dozen large white <i>Locusts</i> and a few <i>Butterflies</i> .
7° - 8° N.	72	A <i>Swallow</i> .
6° - 7° N.	64	Some <i>Dragon flies</i> .
	65	22nd, 1865. From 11 a.m. to noon observed about a dozen <i>Butterflies</i> blowing to leeward just as they do when the wind is off the land on the coast of India, wind N.Wly.—2 p.m., 4th, 1864. (The ship having just lost the N.E. Trade, and the wind variable). A cloud of <i>Insects</i> came on board and covered our upper stays, braces, &c., they are about three inches long with two pairs of wings, and are called in the Southern States " <i>Mosquito Hawks</i> ." 6 a.m., 5th, <i>Insects</i> still cover our upper gear and show no disposition to leave us. (NOTE.—These insects were more than 600 miles from any land, and were most probably brought from Africa by the tornadoes which blow from the Ed. during the commencement of the rains. Table 1 shows that they were in the zone of least wind, where the Trades meet.)
4° - 5° N.	47	A very beautiful <i>Ring-dove</i> flying about the rigging; it has three distinct rings shaded from black to a pale lavender colour, its head and breast fawn colour, its back brown and speckled like a sparrow. (NOTE.—This strong winged bird may have followed various ships, but it will be noticed that all <i>insects</i> were seen in or N. of the Doldrum, indicating that they were brought by the N.Ely wind.)
Cetacea.		
8° - 9° N.	82	Several <i>Sperm Whales</i> distant about a mile, apparently having a frolic among themselves.
5° - 6° N.	51	Several <i>Sperm Whales</i> to the N.Ed.
2° - 3° N.	20	One small " <i>Right Whale</i> " seen. (NOTE.—The 2nd figures of the s.-squares show that all the whales were on the En. side of the square.)
9° - 10° N.	94	A large <i>Blackfish</i> .
6° - 7° N.	65	A number of <i>Blackfish</i> going to the S.Wd.
	66	<i>Blackfish</i> .
	67	School of <i>Blackfish</i> going East. Numerous <i>Blackfish</i> lying on or moving lazily through the water. (NOTE.—The <i>Blackfish</i> in s.-s. 67 were seen at the same time as the vast number of mollusks mentioned below. Perhaps they were feeding on them.)

Latitude.	Sub-square.	Remarks on Natural History.
3° to 10° N.	- -	<i>Porpoises</i> were seen in sub-squares 95,* 84, 66, 54, 56, 35. In s.-s. 84 they were going to the Sd. (NOTE.—It will be seen that nearly all the Cetacea were in the Nn. part of the square, see the first figures of the sub-squares. There are only two exceptions, viz., the Right whale in s.-s. 20, and the Porpoises in s.-s. 35. This looks as if most of them preferred the warm Ely. current.)
<i>Fish, &c.</i>		
0° - 7° N.	- -	<i>Albicores</i> were seen in s.-ss. 64, 54, 56, 20, 26, 15, 03, and 06. NOTE.—They seem to have abounded in the Wly. current.
2° - 9° N.	- -	<i>Bonitos</i> were seen in s.-ss. 84, 72, 74, 64, 69, 52, 54, 42, 47 (3 entries), 48, 37, 20. In s.-s. 47 the two dots only apply to one of the entries.
4° - 5° N.	- -	<i>Dolphins or Coryphæna</i> were only seen in s.-s. 48.
0° - 10° N.	- -	<i>Flying Fish</i> were seen in twenty-nine sub-squares; very abundant in s.-ss. 94, 95, 74, 47, 48, 25, 27, 18, 03, and 07.
6° - 7° N.	- -	<i>Skipjacks</i> were seen in s.-ss. 66 and 67.
5° - 7° N.	- -	<i>Sharks</i> „ 63, 66, 67, 56.
1° - 10° N.	- -	<i>Fish</i> (no names given) were seen in sub-squares 93, 95, 82, 73, 74, 75, 29, 19.
0° - 10° N.	- -	<i>Portuguese-men-of-war</i> „ 93, 73, 66, 26, 07.
<i>Remarks.</i>		
9° - 10° N.	94	Numerous small <i>Acalephæ</i> .
	96	Number of <i>Polypi</i> .
7° - 8° N.	73	A few <i>Acalephæ</i> .
	77	Numerous small <i>Mollusks</i> like a small mushroom and of a lilac colour.
6° - 7° N.	67	Small <i>Mollusks</i> in vast numbers.
5° - 6° N.	52	<i>Polypi</i> .
4° - 5° N.	44	Plenty of <i>Flying Squid</i> .
0° - 1° N.	07	Passed several <i>Verella</i> —Many <i>Cuttlefish</i> .
<i>Sea-Birds.</i>		
8° - 9° N.	87	One bird like a <i>Booby</i> .
1° - 10° N.	- -	<i>Birds</i> (supposed to have been Sea Birds) were seen in sub-squares 94, 95, 83, 72, 73 (twice), 74, 76, 64, 55, 56, 42, 47, 48, 38, 25, 27, 18. In sub-square 55 the remark says, Great number of sea-gulls, more than I have ever seen before in this parallel. In eight of the sub-squares they are called gulls, in 72 and 73 “body black and belly white,” in 64 “many brown gulls.”
NOTE.—It seems worthy of remark that in June there is no mention of <i>Stormy Petrels</i> , but there is a greater number of large birds. Perhaps the <i>Petrels</i> keep near the shore for breeding purposes. (See the remark on them in August.)		

* One dot under a sub-square indicates that the creatures were abundant; two dots that they were very abundant, &c.

FALLING STARS.

There are 17 entries of Falling Stars, distributed over seven years between 1856 and 1870; of these four were in 1860, three in 1859, and three in 1870. The following remarks seem worthy of extraction:—

Sub-Square.	Hour.	Day.	Year.	Remarks on Falling Stars.
09	4 a.m.	30	1856	Several stars shooting from N.N.E.
66	9 p.m. to midnight.	13	1857	Eight stars shot to the N.Ed. and one to the S.Wd.
87	8 p.m.	15	1857	A few stars shot to the N.Ed.
78	4 a.m.	11	1859	Many falling stars, some particularly bright.
54	8 p.m.	26	1859	A number of stars shooting from S.E.
75	8 p.m.	7	1860	Stars shooting from W. to E., close to the horizon.
33	10 p.m.	13	1860	Several stars shot from E.S.E to N.N.E.
12	4 a.m.	20	1869	Stars shooting from W. b. N. to E. b. S.
43	10 p.m.	2	1870	Stars shooting in various directions.
25	8 p.m.	9	1870	Stars shooting from the Ed. towards the Sd. and S.Wd.
92	3 a.m.	22	1870	Two meteors, one following the other, appeared about 10° above the horizon to the N.Ed. and moving to the S.Wd. They disappeared about 15° above the horizon, leaving a pale blue tail visible about a minute.

TEMPERATURE OF RAIN AND AIR.

Sub-Square.	Temperature of Rain.	Temperature of Air.
	°	°
98	71.0	73.6
60	74.0	75.2
62	75.0	76.8
	75.0	77.0
64	74.5	75.0
65	72.0	75.7
	75.0	78.0
67	74.6	76.2
	73.8	75.7
	76.0	78.0
51	73.0	78.6
52	75.0	75.8
58	73.0	75.8
41	75.0	75.0
	73.0	76.0
47	73.5	75.0
	74.0	76.0
48	75.8	79.3
31	74.0	75.6
	74.0	77.1
10	74.0	76.1
	21) 85.2	21) 131.5
	74.1	76.3
		Difference 2°.2.

Sub-square.	Various.
66	Passed a long line of foam and brown matter about 2 feet wide, and at least 2 miles long, in which were many Portuguese-men-of-war, &c. &c.
47	Sounded with 100 fms. of line, 75 up and down, and got no bottom, in 4° 14' N., 27° 36' W., near a bank reported by Capt. Walker in Maury's charts.
37	In lat. 3° 49' N., 27° 43' W. Sounded with 100 fms., say 70 perpendicular, and got no bottom, so I conclude we are to the Ed. of Walker's shoal.
15	A very small Grub-Fly appeared in the cabin in great numbers. (The ship was outward bound from Leith.)

BEST ROUTES FOR CROSSING THE EQUATOR.

Appendix B shows that in June the mean force of all winds is decidedly stronger on the Wn. than on the En. side of Square 39. It also shows that abreast of the Cape Verd Islands there are more light S.Ely., N.Wly., and variable winds, and very many more calms on their En. than on their Wn. side.

The following Table may be usefully consulted with the June Table of Appendix B. It shows the three points of each quarter of the compass from which the wind prevails in each half of Square 39, and proves that between 14° and 20° N. the N.Ely. winds of the Wn. half are more Ely. than those of the En. Also that the S.Ely. winds are chiefly E., and seldom to the Sd. of E.S.E., except between 14° and 16° N. in the En. half, where they are chiefly S.E. The N.Wly. winds are generally N. by W. or N.N.W.

TABLE 12.

The Direction of the three Prevailing Winds of each quarter of the compass in each half of Square 39. They are in the order of their prevalence. A dash under a letter or figure indicates extreme prevalence.

Latitude.	N. to E. b. N., or N.Ely. Winds.		E. to S. b. E., or S.Ely. Winds.		S. to W. b. S., or S.Wly. Winds.		W. to N. b. W., or N.Wly. Winds.	
	Wn. half. 25° to 30° W.	En. half. 20° to 25° W.	Wn. half. 25° to 30° W.	En. half. 20° to 25° W.	Wn. half. 25° to 30° W.	En. half. 20° to 25° W.	Wn. half. 25° to 30° W.	En. half. 20° to 25° W.
	Points from North.	Points from North.	Points from South.	Points from South.	Points from South.	Points from South.	Points from North.	Points from North.
18° to 20° N.	4, 3, 2	2, 4, 3	8, 7, -	- - -	- - -	- - -	1, - -	- - -
16° - 18° N.	4, 5, 2	2, 3, 4	8, 7, 5	- - -	- - -	- - -	1, - -	2, - -
14° - 16° N.	6, 4, 5	4, 2, 3	8, 7, 6	4, 5, 6	- - -	- - -	2, 3, -	2, - -
12° - 14° N.	4, 5, 3	6, 2, 4	8, 7, 6	7, 8, -	- - -	2, - -	1, 2, 3	1, 2, -
10° - 12° N.	2, 3, 4	2, 6, 4	8, 7, 6	8, 7, -	S, 7, 1	- - -	1, 2, 3	2, 5, 4

The accompanying Chart for June, and the prevailing-wind-arrows on the Diagram in its lower right-hand corner, show that the N.Ely. wind prevails between 6° and 10° N. on the Wn. side of Square 3, but only between 8° and 10° N. on its En. side, where it is also much lighter and more Nly. (Before consulting the Chart it will be well to read the paragraph on p. 9, which precedes the Remarks for January.) The Chart and Diagram also show that S.Ely. winds prevail in the rest of the square, drawing more Sly. on its En. side between 6° and 8° N.

The red sections on the Chart and current arrows on its Diagram show that where the Nly. wind prevails there are light currents running a little to the Sd. of W., whilst from 0° to 4° N., in the strength of the S.Ely. wind, a strong current prevails running a little to the Nd. of W.; between these is a very decided N.Ely. current.

Appendix C. shows that there is very little difference in the *direction* of the prevailing winds of the Wn. and En. parts of Square 303 in June; this is best shown by running a pencil line down each table, making it pass through the largest percentage

of wind for each degree of latitude, and comparing the one with the other. By meaning the 10 points through which they pass it is shown that the mean direction of prevailing wind in the En. part is S.E. $\frac{1}{4}$ E., whilst that of the Wn. is S.E. $\frac{1}{2}$ E. But the mean force of the prevailing winds in the En. part is 4.6* whilst in the Wn. part it only amounts to 4.2. By meaning the ten wind forces in the left-hand column of each part of the square it is shown that the mean force of all winds is 4.3 in the En. and 4.1 in the Wn. part. On comparing the mean forces for each degree of latitude the greatest difference is found in the Sn. part of the square: between 9° and 10° S. the Eastern part has 0.9 stronger winds than the Western.

The above facts seem to show that the *Outward-bound* ship should pass to the Wd. of the Cape Verd Islands and stand to the Sd. in about 26° W. After meeting the Sly. wind she should stand boldly to the S.Ed., and not tack so long as she can make Southing, until she has stood well to the Ed., always bearing in mind that although the prevailing current is Ely. down to 4° N., after passing that parallel she will be liable to a very strong Wly. current, frequently amounting to 60 miles in the 24 hours, and averaging more than 30 miles between 1° and 2° N. (See Table 4 for June.) It must also be remembered that as the ship makes Southing the wind draws more Ely., so that, with the prevailing wind, it will be almost impossible to make Easting without Northing after passing to the Southward of 5° N. The Equator should be crossed as far to the Ed. as the above rules will allow, for the Outward-bounder gains nothing by closing with Cape St. Roque.

The iron barque "Panic" of Liverpool, Capt. Blake, crossed the Equator about 11 p.m. of the 19th June in about 29° 26' W. On the 20th she was in 1° 33' S., 29° 54' W.; the 21st 4° 27' S., 30° 38' W.; the 22nd 7° 1' S., 31° 37' W.; the 23rd 8° 29' S., 32° 12' W.; the 24th 10° 6' S., 31° 34' W. The wind was light, but generally favourable between the 22nd and 24th. After the 24th it was very variable in direction and strength, chiefly Sly. and sometimes S.Wly. She had not much current, but what she had was Wly. From the Equator to 10° S. in 4½ days may be considered a very favourable crossing for a ship so far west in June, still she would probably have done better had she been further east, and she might also have had better winds after the 24th.

The *Homeward-bound* ship will have slightly stronger winds by keeping to the Ed. of 33° W. if she passes through Square 303, but there does not seem to be much choice in Square 3; perhaps it would be best to pass to the Nd. so as to be in 26° W. between 6° and 8° N., where she would be likely to pick up a steadier, stronger, and more Ely. N.E. Trade than if she were further to the Ed., and Appendix B. shows that Square 39 has stronger winds on its Wn. than on its En. side. In opposition to this opinion she is likely to keep light Sly. (or fair) winds longer by passing up the En. side of Square 3.

* For the value of these forces in miles per hour of Beaufort's ship see the note to Beaufort's scale on the upper right-hand corner of each Chart.

JULY.

Barometer.—The isobars (see the Diagram in the lower right-hand corner of the Chart) show that the highest pressure continues in the S.En. corner of the square, whilst the lowest is now in its N.Wn. corner. The mean pressure in s.-s. 00 is 30.069 (the highest recorded in the square during the whole year), whilst in s.-s. 99 it is only 29.984, and the isobars show a gradual decrease of pressure between them.

The highest mean pressure in the lateral strips (30.046) is between 0° and 1° N., whilst the lowest (30.009) is between 7° and 8° N.: it only amounts to 30.010 between 8° and 10° N.

Pressure has increased generally since June, but by comparing the means for the lateral strips in the two months it is shown that in the Sn. half of the square there has been an average increase of .042 of an inch, whilst between 5° and 10° N. the increase becomes gradually less from .030 between 5° and 6° N. to .003 between 9° and 10° N.

The mean of the means in the lateral strips (30.025), compared with that for June, shows that the Mean Pressure of the square has increased .028 of an inch. The mean pressure of the vertical strips, shows that there has been greater increase of pressure on the En. than on the Wn. side of the square, and there has also been a greater decrease in the temperature of air and sea on its En. than on its Wn. side. The highest mean monthly pressure for the whole year takes place in July, but the Sn. progress of the sun has already checked the increase of pressure, especially in the Nn. part of the square.

The relative directions of prevailing-wind-arrows and isobars is well shown by the Diagram on the lower right-hand corner of the Chart.

Air Temperature.—The air isotherms, when compared with those for June, show a very decided decrease of temperature in the Sn. part of the square. By comparing the mean temperatures in the lateral strips it is shown that from 4° to 10° N. the decrease averages 0° 6, but between 0° and 4° N. it averages 1° 7; a similar change will be found in the temperature of the sea. The prevailing current arrows show that this rapid decrease of temperature is over that part of the sea where there is a very strong Wly. current, which is water brought up by the freshening S.E. Trade, from a part of the sea which is experiencing the Sn. winter; whilst the smaller decrease is over an Ely. current. The Mean Temperature of the whole square (78°) shows a decrease of one degree since June. This is the greatest decrease in the monthly means which takes place throughout the year. The vertical strips show that the air temperature has decreased more on the En. than on the Wn. side of the square. It will

be noticed how both the air and sea isotherms are nearly at right angles to the direction of the prevailing-wind-arrows.

Dry and Damp Bulbs.—The lateral strip having the least mean difference between dry and damp bulbs ($2^{\circ}8$) is between 9° and 10° N., the greatest ($4^{\circ}2$) lies between 2° and 6° N.: between 0° and 1° N. it is only $3^{\circ}6$. This smaller difference in the Sn. part of the square, where there is the least Amount of Cloud and fine weather, was remarked upon in June, it is most probably caused by the large amount of moisture which is condensed over the cold water of the Wly. current brought up by the S.E. Trade. It will be seen that there is also much mist and dew near the Equator, and that the sea appears green, which is common in misty weather. The vertical strips, compared with those for June, show that the difference of dry and damp bulbs has increased on the En. and decreased on the Wn. side of the square. The Mean for the whole square is $3^{\circ}7$, showing an increase of $0^{\circ}2$ since June; but on analyzing the change it is found to have *decreased* between 8° and 10° N.; the decrease amounting to $0^{\circ}9$ between 9° and 10° N. Between 0° and 7° N. it has increased, the increase amounting to $0^{\circ}8$ between 4° and 6° N.

Sea Temperature.—The isotherms of sea temperature still agree remarkably with those of the air, and continue about 1° higher. The means of the lateral strips, compared with those for June, show an increase of $0^{\circ}4$ between 9° and 10° N., but a decrease elsewhere, the decrease being only $0^{\circ}2$ between 8° and 9° N., and amounting to 2° between 0° and 2° N. The remarkable way in which the sea suddenly decreases in temperature between 4° N. and the Equator, taken in connection with the reverse of current which takes place at 4° N., shows how the observations of temperature and current support each other. The change in temperature of the air is also checked in a remarkable way at 4° N., even though the Sly. wind continues throughout the square. The greatest decrease of temperature still seems to have been in the S.En. corner of the square, and a comparison of the vertical strips for the two months shows that the decrease has been very decidedly greater on the En. than on the Wn. side of the square. The Mean Surface Temperature of the whole square (79°) shows a decrease of $1^{\circ}1$ since June. This is very nearly the same as that for the air.

Specific Gravity.—The lowest specific gravity (1.0261) is between 6° and 7° N., very near to the largest amount of rain. It increases to 1.0268 between 9° and 10° N., and to 1.0270 between 0° and 2° N. The Mean for the square (1.0267) shows no change since June, but a comparison of the two months shows that, as in June, it has decreased between 6° and 10° N., whilst it has increased between 0° and 6° N. The vertical strips show a decided increase on the En. side of the square, and a slight decrease on the Wn. side. Table 10 shows that there has been much more rain on the Wn. than on the En. side of the square; in June this order was reversed.

WIND.

TABLE 1.—LATERAL STRIPS.

Lateral Strips. 10° of Longitude by 1° of Latitude.	No. of Observa- tions.	Mean Force of Strip.	N. to E. by N. or N.Ely.		E. to S. by E. or S.Ely.		S. to W. by S. or S.Wly.		W. to N. by W. or N.Wly.		Variables.		Calms.	Prevailing Wind.		Strongest Wind.*	
			%	Mean Force.	%	Mean Force.	%	Mean Force.	%	Mean Force.	%	Mean Force.		No. of Observations. Direction.	Mean Force.	No. of Observations. Direction.	Mean Force.
9° to 10° N. -	513	2.7	14	2.6	10	2.9	43	3.4	16	2.6	7	2.1	10	S.W. ⁴⁷ by S. ⁵⁸	3.4	S.W. ³⁵	3.7
8° - 9° N. -	521	2.9	9	2.5	20	3.0	49	3.5	7	2.6	7	2.2	8	S. ¹⁰³	3.5	S.S.W. ³⁴	3.8
7° - 8° N. -	590	3.2	5	2.5	23	3.3	57	3.7	3	2.0	6	2.4	6	S. ¹⁰³	3.7	W. by S. ⁶	4.0
6° - 7° N. -	455	3.6	2	1.8	30	3.8	58	3.8	2	3.5	6	2.6	2	S. ¹⁰³	3.8	S. by W. ⁶⁴	4.1
5° - 6° N. -	367	4.1	—	—	52	4.2	43	4.2	2	2.8	2	2.2	1	S. by E. ⁸¹	4.1	S.E. ¹¹	4.8
4° - 5° N. -	317	4.1	—	—	71	4.1	26	4.2	1	3.0	2	1.9	—	S.S.E. ⁸³	4.1	E. by S. ²	5.0
3° - 4° N. -	307	4.1	—	—	87	4.2	11	4.1	—	—	2	1.6	—	S.S.E. ⁸¹	4.1	S.E. by E. ⁹	4.8
2° - 3° N. -	275	4.3	—	—	88	4.3	11	4.0	—	—	1	5.0	—	S.E. by S. ⁶²	4.3	E. ³	5.0
1° - 2° N. -	251	4.3	1	1.0	93	4.3	6	4.1	—	—	—	—	—	S.E. by S. ⁶⁰	4.5	S.W. by S. ²	5.0
0° - 1° N. -	227	4.3	3	4.0	93	4.3	3	5.7	—	—	1	3.5	—	S.E. by E. ⁴⁶	4.2	S. ⁶	5.7

TABLE 2.—VERTICAL STRIPS.

Vertical Strips. 10° of Latitude. by 1° of Longitude.	No. of Observa- tions.	Mean Force of Strip.	N. to E. by N. or N.Ely.		E. to S. by E. or S.Ely.		S. to W. by S. or S.Wly.		W. to N. by W. or N.Wly.		Variables.		Calms.	Prevailing Wind.		Strongest Wind.*	
			%	Mean Force.	%	Mean Force.	%	Mean Force.	%	Mean Force.	%	Mean Force.		No. of Observations. Direction.	Mean Force.	No. of Observations. Direction.	Mean Force.
20° to 21° W.	221	4.2	1	3.5	52	4.3	45	4.3	1	2.5	1	2.0	—	S. ³⁸	4.4	S. by W. ³³	4.7
21° - 22° W.	313	4.1	—	—	56	4.3	38	4.1	2	2.6	2	3.1	2	S.S.E. ⁴⁸	4.2	E. by S. ⁵	4.8
22° - 23° W.	440	3.8	1	2.1	49	4.1	42	3.9	4	2.9	3	2.5	1	S.S.E. ⁵⁹	4.1	E. by S. ⁵	4.8
23° - 24° W.	587	3.6	4	2.2	47	4.0	37	3.7	3	2.6	6	2.0	3	S.S.E. ⁷⁵	4.0	S.E. by E. ¹⁹	4.3
24° - 25° W.	592	3.6	2	2.6	44	4.1	43	3.6	5	2.7	3	2.8	3	S. ⁹²	3.7	E. by S. ⁷	4.9
25° - 26° W.	575	3.2	6	2.6	45	3.9	33	3.5	3	2.4	5	1.9	8	S. by E. ⁷⁰	3.6	S.E. ⁴²	4.2
26° - 27° W.	429	3.3	7	2.5	42	3.8	33	3.7	6	2.6	5	2.4	7	S. by E. ⁴⁶	3.6	S. ⁴³	4.2
27° - 28° W.	326	3.4	9	3.0	42	3.8	34	3.9	4	2.5	7	2.1	4	S. by E. ³⁸	3.3	S.W. ¹¹	5.0
28° - 29° W.	163	3.6	9	2.4	45	4.4	33	3.4	7	2.4	4	2.4	2	S.E. by S. ²⁰	4.7	S.E. by S. ²⁰	4.7
29° - 30° W.	177	3.3	9	2.3	58	3.8	21	2.9	7	2.3	2	3.5	3	S.E. by S. ³⁴	4.2	S.E. by S. ³⁴	4.2

* In recording the Strongest Wind in a Strip, weight has been given to the number of observations; otherwise the direction and force of a single squall would frequently appear in this column.

By comparing the means of the percentages in the *lateral* strips (Table 1) with those for June the following results are shown for the whole square :—

N.E. wind	3°/	and decreased	16°/	since June.
S.E. "	57 "	and increased	4 "	"
S.W. "	31 "	"	21 "	"
N.W. "	3 "	and decreased	2 "	"
Variables	3 "	"	3 "	"
Calms	3 "	"	4 "	"

The Mean of the mean forces of all winds in the 10 strips in Table 1 is 3·8, which compared with that for June, shows an increase of 0·8. This is the greatest increase for any month in the year, and amounts to about 1½ miles an hour in the speed of Beaufort's ship. By comparing the means for each strip it is shown that the increase of force gradually gets larger as you proceed N. from the Equator to 6° N., where it amounts to 1·6 of Beaufort's scale; from 6° to 9° N. the increase gradually gets less, and between 9° and 10° N. there is no change in the mean force of all winds. On comparing the mean forces of the winds from the different quarters in each strip it is shown that between 6° and 10° N. N.Ely. winds have *decreased* in force about 0·6 of Beaufort's scale since June, whilst S.Ely. and S.Wly. winds have increased throughout, the increase being more than 1·0 of Beaufort's scale between 4° and 8° N. The few N.Wly. winds which are experienced have also increased in force. From 5° to 10° N. the number of S.Wly. winds has increased nearly 40°/ since June.

The prevailing-wind-arrows in the small Diagram on the lower right-hand corner of the Chart show how the S.E. wind gradually changes to South as it advances to the Nd., also, when compared with those for June, how in the N.Wn. corner of the square, where N.Ely. winds then prevailed, light Sly. winds are coming in, though they have not got their full force; but by looking forward it will be seen how they have their full force in August, and begin to lose it again in September, showing how peculiarly liable the N.Wn. corner of the square is to the influence of the N.Ely. wind, extending as it does more from under the lee of Africa than the rest of the square.*

Appendix B. shows that between 10° and 12° N. in July the N.Ely. wind prevails on the Wn. side of Square 39, whilst S.Wly. winds prevail on its En. side. Hence we may suppose that in this month the Doldrum lies just to the Nd. of 10° N.

Table 2 shows that there is more Nly. wind on the Wn. than on the En. side of Square 3, also that S.Wly. winds are stronger and more frequent on its En. than on its Wn. side, these facts are graphically shown by the En. and Wn. strips, and by the vertical strips at the bottom of the published Chart.

* By consulting a map of Africa it will be seen that the coast-line of the N.W. coast of Africa runs S.W. and N.E., and that if this line be continued to the S.Wd. it passes to the Ed. of the Cape Verds, and cuts off the N.Wn. corner of Square 3, which is the part where the N.E. Trade is so persistent.

TABLE 3.

Latitude.	S.-S.	Winds, Force 7 or upwards, but not Squalls.	Direction of Squalls and Heavy Squalls. (All Squalls Force 7 or upwards are considered to be heavy.) (All Squalls on either side of N., S., E., or W., are given to their re- spective quarters, so that there are fewer from the above-named points than from the quarters.)								S.-S.	REMARKS. NOTE. A bar, thus —, separates the Remarks of different Logs. The dates of the Trade limits are in the order of the sub-squares in which they occurred, beginning with the most Eastern one.							
			N.	N.E.	E.	S.E.	S.	S.W.	W.	N.W.									
			Heavy.	Heavy.	Heavy.	Heavy.	Heavy.	Heavy.	Heavy.	Heavy.									
9° to 10° N.	95	S.Ely. 7	-	-	-	-	2	-	-	-	2	2	-	-	-	-	94-99	Sn. limit of N.E. Trade on 4th, 2nd, 9th, 2nd.	
																	95	Nn. limit of S.E. Trade, on the 22nd.	
																	96	Seem to have got into S.W. monsoon.	
																	93	Frequent squalls during forenoon; force 7.	
																	95	Wind variable round the compass.—Got the S.W. monsoon.	
																	96	Wind gusty and variable between W. by S. and S.W. by W.	
																	99	Light catpaws from N.N.W., E.N.E., S.S.E., and S.S.W.	
8 - 9° N.	87	S.W. 8 (twice.)	-	-	-	-	-	1	1	5	-	2	1	-	-	-	-	87	Sn. limit of N.E. Trade on the 4th.
																	81	Cannot get to the Sd., on whichever tack we go we break off.	
																	83	13th. Calms and heavy rain with thick fog the whole 24 hrs.	
																	84	Wly. wind draws more Sly. in the squalls.	
																	85	Light baffling Sly. puffs heading us on both tacks. Ship bound S.	
																	86	7th. S.W. monsoon seems to have set in.	
																	87	Strong S.W. wind and hard puffs.	
7° - 8° N.	72	W.S.W. 8	-	-	-	1	1	-	2	1	1	-	6	5	-	-	-	72	Stiff Sly. breeze, with heavy rain and thick fog the principal part of the day.
																	73	Sly. wind unsteady; cannot make southing on either tack.	
																	74	Black and threatening squalls from S.E., force 6 in the puffs; after the squalls wind from S. to S.S.W.—Heavy squall from N. by E., force 9, lasting 20 minutes.	
																	75	Wind flying all round compass.	
																	76	Wind in squall S.E. by S. 9. Midt. to 4 a.m. incessant squalls from W. to S.W., force 6 to 7	
																	77	A sudden squall and shift of wind to N.W., with heavy rain: wind supposed to have been Sly. before the shift.	
6° - 7° N.	61	S. b. W. 7	-	-	-	-	-	5	1	-	-	4	2	1	-	1	-	64	Puffs from S. by W. and S. by E. Succession of squalls from S. by W. to S. by E.
	66	S. 7															66	16th. A squally breeze from N.E. by N., force 5 for a short time, afterwards calm.	
5° - 6° N.	53	S. b. W. 7	-	-	-	-	-	1	2	2	-	1	1	-	-	-	53-59	Nn. limit of S.E. Trade, 16th, 1st, 4th.	
	54	" 7															54	13th, the wind shifted suddenly to N.N.E. for 2 hrs., and back to S.S.W., with heavy rain.	
																	55	23rd. Wind shifted suddenly from S.W. to N.E., with heavy rain.	
																	57	Squalls all round, no wind, but plenty of rain in them.	
4° - 5° N.	41	S. 7 (4 times.)	-	-	-	-	-	3	-	-	-	1	1	-	-	-	43-46	Nn. limit of S.E. Trade, 7th, 1st, 21st, 3rd.	
	42	S. 7															42	Gusty.	
	43	S.S.E. 7															44	A strong dry squall from S. by W.	
																	48	A few light showers killed the Sly. wind.	

TABLE 3—continued.

Latitude.	s.-s.	Winds, Force 7 or upwards, but not Squalls.	Direction of Squalls and Heavy Squalls.								s.-s.	REMARKS.					
			(All Squalls Force 7 or upwards are considered to be heavy.) (All Squalls on either side of N., S., E., or W., are given to their respective quarters, so that there are fewer from the above-named points than from the quarters.)														
			N.	N.E.	E.	S.E.	S.	S.W.	W.	N.W.							
			Heavy.	Heavy.	Heavy.	Heavy.	Heavy.	Heavy.	Heavy.	Heavy.							
3° to 4° N.	32 34 35	S. S.E. S. S.E.	7 7 7 7	- - - -	- - - -	- - - -	- - - -	2 - - -	- - - -	- - - -	- - - -	30 & 34 35 37 38 21 & 28	Nn. limit of S.E. Trade on 18th and 20th. 16th. Passed through variables without calms, with very few squalls, and little rain. Ship from the Nd. Puffy. Lost S.E. Trade and got S.W. monsoon on 26th. Nn. limit of S.E. Trade on 21st and 18th.				
2° - 3° N.	26	S.	7	-	-	-	-	-	-	-	-	-	18 13 18	Nn. limit of S.E. Trade on 14th. Wind veering from E.S.E. to S.S.E. and back. Dark arched squalls rising, drawing the S.E. wind Sly.			
1° - 2° N.	16	S.	7	-	-	-	-	1	-	-	-	-	-	05 & 07	Nn. limit of S.E. Trade on 4th and 8th.		
0° - 1° N.	05 06 07	S. b. W. S. S.	7 7 7	- - -	- - -	- - -	- - -	- - -	- - -	- - -	- - -	- - -	-				
Sum	-	23, all from some Sn. direction.	-	-	-	1	1	-	15	7	8	-	16	12	1	-	-

NOTE.—It will be seen that several of the strong winds are in the Nn. part of the square and S.Wly.; this was not the case in June. They are very equally divided between the En. and Wn. sides of the square.

Nearly all the squalls are from some Sly. direction, and there were more remarked upon on the En. than on the Wn. side of the square, but more observations were taken there. S.Wly. squalls have increased in number and force since June; they are now more abundant than the S.Ely.

Table 3 shows how Sly. winds have taken charge of the square. Winds of force 7 or upwards, which were not squalls, have been reported 23 times, and all were Sly. There were 62 remarks on squalls, of these 58 were from some Sly. quarter. The heaviest squalls were between 7° and 8° N. where they were also most abundant. In s.-s. 74 was the only N.Ely. squall, and it was very heavy; in s.-s. 76 there was as heavy a S.Ely. squall. In s.-ss. 54 and 55 the wind shifted suddenly from S.W. to N.E. These changes took place on the 13th and 23rd of the month, when the Sly. winds might have been considered well established, but it will be seen that between 5° and 6° N. the lower clouds were once from N.E. when the wind was S.E., and twice when the wind was S.W., so that the N.Ely. current of air seems to have been very low, and may have rushed to the surface on the above occasions. The Sn. limit of the N.E. Trade was remarked upon four times between 9° and 10° N., and once between 8° and 9° N.; all the cases were early in the month, viz., twice on the 2nd, twice on the 4th, and once on the 9th, and all but one to the Westward of 26° W., the exception being between 24° and 25° W. Hence it may be concluded that by the middle of July the N.E. wind has disappeared from the square, and earlier still from its En. side.

CURRENTS:

TABLE 4.—LATERAL STRIPS:

Lateral Strips. 10° of Longitude by 1° of Latitude.	No. of Observations.	Mean Rate.	N. to E. by N. or N.Ely.		E. to S. by E. or S.Ely.		S. to W. by S. or S.Wly.		W. to N. by W. or N.Wly.		None.	Prevailing Current.		Strongest Current.*	
			%	Mean Rate.	%	Mean Rate.	%	Mean Rate.	%	Mean Rate.		No. of Observations. Direction.	Mean Rate.	Direction.	Rate.
9° to 10° N.	56	14	27	19	29	20	16	12	12	14	16	E. by S. ⁵	24	E. by S.	40
8° - 9° N.	65	16	35	20	31	19	11	15	6	22	17	E. ⁸	20	N.E. by N.	43
7° - 8° N.	61	20	48	23	34	22	5	9	7	24	6	E. ¹⁰	21	E.N.E.	43
6° - 7° N.	62	21	47	26	34	21	2	11	6	24	11	E. ¹¹	24	E. by N. twice	52
5° - 6° N.	54	22	45	25	33	23	2	21	7	33	13	E. by N. ⁶	23	N.E. by E.	52
4° - 5° N.	65	17	32	19	23	16	11	15	22	26	12	N.E. by N. ⁴	20	E.	44
3° - 4° N.	61	19	8	14	10	18	26	24	46	22	10	W. ⁷	19	W. by S.	57
2° - 3° N.	48	26	2	11	4	11	19	23	69	30	6	W. ¹⁰	27	N.W. by W.	68
1° - 2° N.	60	34	5	7	-	-	27	31	63	40	5	W. ¹⁷	45	W.	72
0° - 1° N.	34	21	6	8	3	14	26	31	50	25	15	W. by S. ³	35	W.	56

TABLE 5.—VERTICAL STRIPS.

Vertical Strips. 10° of Latitude by 1° of Longitude.	No. of Observations.	Mean Rate.	N. to E. by N. or N.Ely.		E. to S. by E. or S.Ely.		S. to W. by S. or S.Wly.		W. to N. by W. or N.Wly.		None.	Prevailing Current.		Strongest Current.*	
			%	Mean Rate.	%	Mean Rate.	%	Mean Rate.	%	Mean Rate.		No. of Observations. Direction.	Mean Rate.	Direction.	Rate.
20° to 21° W.	35	20	34	20	29	17	11	19	23	27	3	E.N.E. ⁴	29	N.W. by W.	68
21° - 22° W.	45	24	27	24	20	24	24	22	25	31	4	W. ⁷	33	W.	54
22° - 23° W.	79	22	28	23	20	21	11	25	27	32	14	E. ⁹	22	W.	72
23° - 24° W.	89	23	33	20	30	22	9	30	22	30	6	S.E. by E. ⁸	18	W.N.W.	59
24° - 25° W.	78	21	28	23	27	20	9	24	24	27	12	E. ⁶	17	W.	59
25° - 26° W.	66	21	29	23	15	21	11	19	30	31	15	W. ⁶	43	W.	68
26° - 27° W.	66	19	11	20	24	19	17	20	32	29	16	W. ⁶	36	W. by N.	62
27° - 28° W.	46	21	28	22	15	12	20	27	28	28	9	W. ⁴	29	W.	68
28° - 29° W.	30	14	20	18	10	16	20	18	30	17	20	N.W. ²	37	N.W.	48
29° - 30° W.	32	19	31	15	3	7	19	16	34	31	13	W. ³	34	N. by W.	52

Table 4 shows that very strong Wly. currents still prevail from 0° to 4° N., whilst more moderate Ely. currents are found from 4° to 10° N. Between 1° and 2° N.

* The Strongest Current in each Strip is here given, as it is important to the Navigator to know the extreme to which he is liable.

the mean rate of the 63% of N.Wly. current is 40 miles in 24 hours, whilst the column of prevailing current shows that in the same zone 17 out of 60 currents were to the W., having an average speed of 45 miles in 24 hours, one of them actually reaching the speed of 72 miles in 24 hours, or 3 miles an hour. Between 4° and 9° N. an average of more than 40% of the current is to the Nd. of East. This fact is shown very clearly by the prevailing-current-arrows on the small Diagram in the lower right-hand corner of the Chart. The difference of temperature of these two currents is very decidedly shown by the isotherms. It will be noticed that the small amount of Wly. current which prevailed in the N.W. corner of the square in June, where a N.Ely. wind prevailed, has quite disappeared now that the N.Ely. wind is gone.

Table 5 shows that there is more Ely. current on the En. than on the Wn. side of the square, whilst the reverse is true with Wly. currents. These facts are well brought out by the percentages of the vertical, and En. and Wn. strips on the published Chart.

Current Rips were much more frequently remarked upon between 8° and 10° N. than in other parts of the square; out of the 73 notices of rips in the whole square 22 were between 9° and 10° N., and 18 between 8° and 9° N. Between 9° and 10° N. 14 of the 22 were "heavy rips," of these 12 were on the Wn. side of the square. This seems to bear out the remark in June, viz., that the main cause of the rips is the displacing of a Wly. by an Ely. current, for in this part there was a Wly. current in June, and an Ely. one in July. The remarks on Currents fully bear out the fact that Ely. currents prevailed to the Nd. and Wly. to the Sd. of 4° N.

The following remarks have been extracted from various logs.

Latitude.	Sub-square.	Remarks on Currents. NOTE. A bar, thus —, separates the Remarks from different Logs.
9° to 10° N.	92	Frequent strong tide rips, generally in small circles without any special direction, the water apparently bubbling up and making a noise like boiling water.
	93	Current ripples in E. and W. lines, wind S.Wly. 2 to 3. (2 entries.)
	94	Strong tide rips apparently coming from the Ed. about every 20 minutes.—Current ripples in E. and W. lines, wind S. b. W. 4.
8° - 9° N.	95	Very strong tide ripples, the first this passage. (Ship from North.)
	82	Currents ripples in E.S.E. and W.N.W. lines, wind S.S.W. 1.
	83	Strong current ripples extending about ½ of a mile N.N.E. and S.S.W.—Heavy ripples in lines E.N.E. and W.S.W., wind variable Sly.
	84	Strong ripple setting to the Ed.
	85	Tide rips heavy, while among them the wind is puffy and dies away calm at intervals; this I have invariably observed in tide rips.
7° - 8° N.	74	Strong current ripples extending E. and W.
	75	17th, During 13 days of variables between 10° and 4° N. experienced a current N. 61° E. 229 miles.
	77	A long line of foam in S.E. stretching E. and W. appearing like the edge of a current, wind N.N.E. 2.—Frequent alternate bands of smooth water and strong current rips.
6° - 7° N.	64	Current by boat N.Ely. 1½ miles an hour.
	69	Heavy tide rips to the Nd. of us, distant about 1½ miles. We have not passed through them, though our course is to the Sd.

Latitude.	Sub-square.	Remarks on Currents. NOTE. A bar, thus —, separates the Remarks from different Logs.
5° to 6° N.	52	A very strong current ripple extending E.N.E. and W.S.W., wind S.E.
4° - 5° N.	42	17th. Experienced a very strong Ely. current for several days. (Ship from N.)
	45	9th, 1863. 6 to 8 a.m. Passed through a very rough and turbulent sea, water breaking like boiling water, no change in temperature (79°). Abundance of fish in the bubbling water. This must have been the edge of two currents, one going Ely., the other to N.W.
2° - 3° N.	24	18th. Crossed a strong tide rip: at the meeting of the current the sea was breaking, the line of meeting S.W. by W. and N.E. by E. the ship suddenly "came to" in crossing, probable wind S.E. by E. 4. Temp. in the N.W. current on the Sn. side of a current rip 76°·5: 4 hours afterwards, current Ely. and temp. 79° on the northern side of a current rip. (Ship going N.)
1° - 2° N.	12	Strong tide rips (2 entries), one "very loud."
	15	" " one forcing the ship two points off her course.
	17	Passed through a tide rip, in which the sea was a perfect sheet of light.
0° - 1° N.	01	Strong ripple, direction W.N.W. and E.S.E.

SEA.

The sea was remarked on as "luminous" 66 times, most frequently between 4° and 5° N., where it will be remembered the Ely. and Wly. currents meet. It was "deep blue" 20 times, most frequently between 3° and 6° N. It was "green" 8 times, four times between 7° and 8° N., and four between 0° and 1° N.

Latitude.	Sub-square.	Remarks on Sea. NOTE. A bar, thus —, separates the Remarks from different Logs.
9° to 10° N.	95	Specific gravity at surface 1·0269, temp. 79°; at 10 feet below surface 1·0273 and 78°.
8° - 9° N.	84	Temp. at surface 81·5, at 30 fms. 79·0.
7° - 8° N.	70	Temp. of sea low (76°·5), probably in consequence of heavy rain.
	75	Temp. at surface 82°, at 10 fms. 80°.
6° - 7° N.	62	Water very dark.
	63	Specific gravity at surface 1·0270 temp. 79°·5; at 11 feet 1·0271 temp. 80°.
	64	Temp. at surface 79°·5, at 19 feet 79°.
4° - 5° N.	44	The luminosity of the water increased by the freshening Sly. wind; this made the smoky cumuli look dark and threatening whilst the ship seemed to sail on liquid fire. On examining the water nothing could be seen by the naked eye.
3° - 4° N.	32	9th, 1859. The increased warmth of the sea has brought back the hot weather. NOTE.—On the 8th at noon in 0° 36' N., 21° 7' W., this log had the surface water 73°·9; whilst at noon on the 9th, in 3° 36' N., 22° 40' W., it was 79°·9; in both cases the current was Wly., which tends to show that the equatorial current may be made up of cold water from the S., which forms its Sn. edge, and warm water from the N. Atlantic turned to the Wd. after having formed part of the Ely. Guinea current, and thus becoming the Nn. part of the equatorial current.—A great difference in the temp. of the water; on 29th, 8 p.m., 79°; 30th, 9 a.m., 75°.
		(Ship going East.)
	33	Specific gravity at surface 1·0268 temp. 78°; at 11 feet 1·0266 temp. 77°.
	37	We found the Nn. edge of the Equatorial current 76°, being 4° cooler than the N.Ely. current. (Ship going S.)
2° - 3° N.	22	25th. There is a great change in the temp. of the water, at 4 a.m. 73°, 8 a.m. 75°, Noon 78°·3. (Ship going N.)

Latitude.	Sub-square.	Remarks on Sea.
		NOTE. A bar, thus —, separates the Remarks from different Logs.
1° to 2° N.	10	26th. A great rise in temperature of sea since yesterday, from 73° to 77°. (Ship going N.)
0° - 1° N.	03	Water has the same green appearance and low temperature (71°) as to the Sd.
	04	Noon 1st. Temp. of sea 76°; it has decreased 3° in 8 hrs. (Ship from 0° 49' to 0° 5' N.)
	05	Specific gravity at surface 1·0275 temp. 75°·6; at 10 feet 1·0279 temp. 75°·5.
	07	A decrease of 4° in temperature of water since yesterday, from 78° to 74°. (Ship going S.)
	09	25th. Notable rise of surface temp. from 78° to 80°. (Ship going N.)

The Eastern and Western strips of the published Chart show that Sly. and S.Ely. swells or seas prevail over Nly. and N.Ely. throughout the square; in fact there are very few Nly. and N.Ely. recorded. From the Equator to 4° N., where the Westerly current reigns undisturbed, there is about 40% of smooth sea. Confused sea is common in the Nn. part of the square, especially between 8° and 10° N. in the Eastern strip. Between 2° and 4° N. there is about 3% of confused sea, whilst between 4° and 6° N. it suddenly rises to about 15%, showing the effect of the meeting of the currents.

CLOUDS.

Tables 6, 7, and 8, with the remarks on Clouds, are compiled from the data for 1° sub-squares.

TABLE 6.—LATERAL STRIPS.

PERCENTAGE of each FORM, and MEAN AMOUNT of all CLOUDS.

Lateral Strips. 10° of Longitude by 1° of Latitude.	No. of Observa- tions.	Upper Clouds.			Lower Clouds.				Amount, 10 being "Com- pletely Clouded."	
		Cir.	Cir.-c.	Cir.-s.	Cum.	Cum.-s.	Str.	Nim.	No. of Obs.	Mean.
		%	%	%	%	%	%	%		
9° to 10° N. -	331	8	14	4	37	20	10	38	371	7·2
8° - 9° N. -	301	9	11	6	38	24	12	35	379	6·9
7° - 8° N. -	371	9	14	6	37	22	8	33	453	7·0
6° - 7° N. -	290	9	14	5	43	22	10	29	348	6·9
5° - 6° N. -	242	11	20	7	48	17	11	18	288	5·9
4° - 5° N. -	200	7	20	6	56	17	7	10	243	5·2
3° - 4° N. -	189	7	17	2	71	8	3	8	246	4·3
2° - 3° N. -	171	11	20	4	64	8	6	4	215	4·5
1° - 2° N. -	145	4	21	8	63	10	4	3	195	4·0
0° - 1° N. -	139	12	19	4	60	8	11	4	180	3·8

TABLE 7.—VERTICAL STRIPS.

PERCENTAGE of each FORM, and MEAN AMOUNT of all CLOUDS.

Vertical Strips. 10° of Latitude by 1° of Longitude.	No. of Observa- tions.	Upper Clouds.			Lower Clouds.				Amount, 10 being "Com- pletely Clouded."	
		Cir.	Cir.-c.	Cir.-s.	Cum.	Cum.-s.	Str.	Nim.	No. of Obs.	Mean.
		%	%	%	%	%	%	%		
20° to 21° W.	142	6	15	4	49	17	15	13	178	5·7
21° - 22° W.	187	8	20	5	53	15	11	12	242	5·8
22° - 23° W.	257	6	17	4	50	20	9	18	341	6·2
23° - 24° W.	388	8	19	6	46	25	3	26	479	6·1
24° - 25° W.	348	8	16	5	49	14	11	22	462	5·9
25° - 26° W.	341	10	16	3	39	20	9	28	405	6·2
26° - 27° W.	242	13	11	8	44	19	8	28	286	6·0
27° - 28° W.	211	7	16	6	55	9	8	27	232	5·8
28° - 29° W.	120	4	13	4	58	10	11	18	135	5·2
29° - 30° W.	143	14	17	6	53	13	8	18	158	5·2

The mean of the means in the 10 strips of Table 6 shows that the Mean Amount of Cloud for the whole square is about 5·6, not having changed since June. But by comparing the amounts in various strips it is shown to have increased between 7° and 10° N., but decreased between 2° and 6° N.; the increase amounting to 1·9 between 9° and 10° N., and the decrease to 1·4 between 3° and 4° N. The Amount of Cloud is considerably below 5 over the cold current between 0° and 4° N., and rises rather rapidly between 4° and 7° N. Between 3° and 6° N. the average decrease of Nimbus is 20%, whilst it has increased 21% between 9° and 10° N.

It will be seen that the largest amount of Nim. and of cloud generally is now between 9° and 10° N., indicating that in July the Doldrum extends into Square 39.

By comparing Table 7 with that for June it is shown that the Amount of Cloud has decreased on the En. and increased on the Wn. side of the square. As a Sly. wind has displaced a Nly. one, in the N.Wn. corner of the square since June, an increase in the Amount of Cloud may be expected there. Nim. has decreased more than 20% between 20° and 23° W., showing how much more settled the weather has become on the En. side of the square, whilst the decrease is only about 4% between 23° and 29° W.; between 29° and 30° W. it has slightly increased.

TABLE 8.

The following Table is derived from the Remarks on Clouds in July:—

NOTE.—All cloud entries from N. to E. b. N. inclusive have been given to the N.En. quarter.

" E. b. S. to S. " S.En. "
 " S. b. W. to W. b. S. " S.Wn. "
 " W. b. N. to N. b. W. " N.Wn. "

Upper clouds from E. or W. have been extracted in the Remarks. Lower clouds flying with the wind have not been recorded.

Quarters from which the Clouds and Wind came.		Lower Clouds.			Clouds (doubtful whether upper or lower).			Upper Clouds.		
Clouds from.	Wind from.	Total No. of Observations.	No. in Nn. half of Square.	No. in Sn. half of Square.	Total No. of Observations.	No. in Nn. half of Square.	No. in Sn. half of Square.	Total No. of Observations.	No. in Nn. half of Square.	No. in Sn. half of Square.
N.En.	N.En.	—	—	—	—	—	—	—	—	—
"	S.En.	1	1	—	9	6	—	1	1	—
"	S.Wn.	2	2	—	2	2	3	28	10	18
"	N.Wn.	—	—	—	—	—	—	11	11	—
"	Sn.	—	—	—	—	—	—	1	1	—
"	En.	1	—	1	7	3	4	10	8	2
		4	3	1	18	11	7	51	31	20
S.En.	N.En.	—	—	—	1	1	—	7	7	—
"	S.En.	—	—	—	—	—	—	27	14	13
"	S.Wn.	—	—	—	13	13	—	12	12	—
"	N.Wn.	—	—	—	2	2	—	4	4	—
"	Nn.	—	—	—	2	2	—	1	1	—
"	Sn.	—	—	—	2	2	—	12	12	—
"	En.	—	—	—	—	—	—	3	3	—
"	Wn.	—	—	—	—	—	—	3	3	—
		—	—	—	20	20	—	69	56	13
S.Wn.	N.En.	—	—	—	1	1	—	—	—	—
"	S.En.	—	—	—	5	4	1	8	4	4
"	S.Wn.	—	—	—	—	—	—	1	—	1
"	N.Wn.	—	—	—	1	1	—	—	—	—
"	Nn.	—	—	—	—	—	—	1	1	—
"	Sn.	—	—	—	2	1	1	4	2	2
		—	—	—	9	7	2	14	7	7
N.Wn.	N.En.	—	—	—	1	1	—	—	—	—
"	S.En.	—	—	—	2	—	2	5	1	—
"	S.Wn.	—	—	—	3	3	—	2	2	4
"	Sn.	—	—	—	—	—	—	6	5	1
		—	—	—	6	4	2	13	8	5

NOTE.—The following are the percentages of upper clouds from various quarters, 147 being the total number of observations.

From the N.En. quarter $35\frac{2}{3}\%$ being -5% since June. | From the S.W. quarter $9\frac{1}{3}\%$ being no change since June.
 " S.E. " $47\frac{1}{3}\%$ " $+2\%$ " | " N.W. " $9\frac{1}{3}\%$ " $+3\%$ "

The number of observations of the motion of upper clouds has very decidedly increased in the Nn. and decreased in the Sn. half of the square since June. In the Nn. half of the square the largest number of upper clouds was from S.E., wind S.E.; in the Sn. half the largest number was from N.E., wind S.E. Upper clouds from the S.Wd. were not more common in the Nn. than in the Sn. half of the square. Nearly all clouds or upper clouds from the S.Ed. were in the Nn. half of the square. The only exception is the case of upper clouds from S.E. when the wind was S.E.; of these there are 13 entries in the Sn. half of the square. The numerous entries of clouds from S.E., wind S.W., in the Nn. half of the square lead to the supposition that friction against the Ely. current of water may tend to turn the lower stratum of air into a S.Wly. wind, whilst the upper continues S.Ely.

The following remarks are considered worthy of extraction:—

Latitude.	Sub-square.	Remarks on Clouds.
NOTE. A bar, thus —, separates the Remarks from different Logs.		
9° to 10° N.	93	Cir.-c. from N., N.N.W., and E.N.E., wind W.S.W.
	94	Clouds from S.E. by E. no wind*.—Cir.-c. from E., wind S.S.E.
	95	All rain clouds from the Ed., wind S.S.W.—Lower clouds slowly from W., wind S.W. (2 entries).—Feathery cir. E.N.E. and W.S.W.—Cir. mottled and floating very high.
	96	Beautifully marked cir. in clear blue sky above thin rainy clouds, heavy nim. in the horizon from S.W. to N.W.—Cir. from W. by N., cum. from S. by E., wind S.W. by S.—Clouds from S.W., no wind.
	97	Clouds rapidly from S. by W., no wind.—Light cum. rapidly from S.W. by S., wind S.S.W., 1.
	98	Upper clouds from W.S.W. and W.N.W., wind S.W.
	99	Large smoky clouds form and evaporate again.
8° - 9° N.	83	Clouds from the Nd., wind W.S.W.
	84	Upper clouds from S.E. by E., Cum. from S. by W., wind S. by E.—Cir.-c. from E. by S. and N.W. by W., wind S.W. (2 entries).—Clouds from N. by W. and S. by E., wind S.W. by W.
	85	Upper clouds from S. by E., no wind. Cum. from N.W. by N., no wind.—Clouds passing over the moon from all quarters, wind S.S.E.—Lower clouds slowly from Wd., wind S.W.
	86	Cir. from N.Ed., cum. from S.Wd., wind W. by S.—Cir.-c. from Ed., wind N.E. by N.
	87	Cir.-s. from N.E. by N., cum. from E. by S., wind S.W. by S.
	88	Cir.-c. from various directions, wind S.S.E.
7° - 8° N.	71	Upper clouds from E., wind S. by W.—Dark-looking clouds forming in Sn. horizon which are quite fixed at an altitude of 10° to 15°.
	72	Cir.-c. at a great elevation coming from E.N.E., wind S.S.E.—Clouds very fast from S.S.W., wind W.S.W., 8.
	73	Several strata of clouds, the uppermost from N., the lower from N.N.E., wind Sly.—Upper clouds from N.Wd., lower from S.Ed., wind S.—Upper clouds from W. by N. and S.E. by E., wind S.
	74	Upper strata not very high coming from N.E., wind S. by E.—Clouds from N.Wd., no wind.
	77	Cir.-c. from E., wind S.W.
6° - 7° N.	63	Clouds from E. by S. and S. by W., wind S.—Upper clouds slowly from N. by E., lower fast from S.W. by S., wind S. by W.—Feathery cir. S.E. and N.W., stems to S.E.
	64	Upper clouds from E.N.E., no wind.
	65	Cum.-s. from S.E., wind S.S.W.—Two strata of clouds cover the sky almost entirely, both seem to go with wind from S.—Lower clouds rapidly from N.E. by N., wind N. by E. 1. Lower clouds slowly from N.E. by N., no wind.
5° - 6° N.	50	Cir. high in zenith almost motionless.
	53	Heavy bank of cum. hanging all round to the Nd.
	54	Feathery cir. with stems to the Nd.
	57	Cum. from N.E. by E., wind S. by W.
	59	Heavy bank rose to the S.Wd., another very heavy to the Nd., the Nly. one gained the mastery.
4° - 5° N.	44	Very high upper stratum (mackerel sky); it appeared stationary, but changed rapidly, though the predominant features were the same.

* No wind, means that it was calm at the time.

Latitude.	Sub-square.	Remarks on Clouds.
		NOTE. A bar, thus —, separates the Remarks from different Logs.
4° to 5° N.	45	Upper clouds quickly from E. by N., lower from S. by W., wind S.S.E., 2 to 3.
	46	Cir.-c. from E., wind S.S.E.
3° - 4° N.	37	Lower clouds from E. by S., wind S. by E.—Clouds from a more Ely. direction than the wind. (Wind S.S.E.)—Cir.-c. from Ed. slowly, wind S.
2° - 3° N.	23	Cir.-c. pass at a good rate across the moon from N.E., wind S.E. by S.
	25	Cir. feathery and much scattered, stems to the E.S.E., wind S. by W.
1° - 2° N.	26	Cum. from N.E. by N. and W. by S., wind S. by W.
	17	Cum. from N.E. by N., wind E.
0° - 1° N.	19	Cir.-c. from S.Wd. fast, wind S.E. by S.
	04	Upper clouds from W.N.W., lower from E.S.E., wind S. by E.
	06	11.45 a.m. 23rd 1870. A belt of cloud (cir.-s.) extending from E. to W., and coming up rapidly from N. <i>against the wind</i> , which was S.E. by S. At noon it formed a strongly marked and well-defined arch, obscuring the sun in its passage, the apex being in the zenith; the centre of the belt in the direction of its length from E. to W. was of a dark colour, and resembled what is known by engineers as the <i>web</i> of an iron girder.

WEATHER.

TABLE 9.—LATERAL STRIPS.

Lateral Strips, being 10° of Longitude by 1° of Latitude.	Thunder. (t.) %	Lightning. (l.) %	Squalls. (q.) %	Rain. (r.) %	Mist or Haze. (m.) %	Dew. (w.) %			
9° to 10° N.	-	-	-	2	4	13	23	5	$\frac{1}{3}$
8° - 9° N.	-	-	-	$\frac{1}{2}$	3	12	28	6	$\frac{1}{3}$
7° - 8° N.	-	-	-	$\frac{2}{3}$	2	16	31	3	$\frac{1}{2}$
6° - 7° N.	-	-	-	1	4	11	25	5	$\frac{1}{2}$
5° - 6° N.	-	-	-	$\frac{3}{4}$	2	13	13	9	$\frac{1}{2}$
4° - 5° N.	-	-	-	-	$\frac{1}{3}$	7	4	6	4
3° - 4° N.	-	-	-	-	1	5	6	9	4
2° - 3° N.	-	-	-	-	-	2	1	8	1
1° - 2° N.	-	-	-	$\frac{1}{3}$	$\frac{1}{3}$	3	2	12	5
0° - 1° N.	-	-	-	-	-	3	$\frac{1}{2}$	12	3

TABLE 10.—VERTICAL STRIPS.

Vertical Strips, being 10° of Latitude by 1° of Longitude.	Thunder. (t.) %	Lightning. (l.) %	Squalls. (q.) %	Rain. (r.) %	Mist or Haze. (m.) %	Dew. (w.) %
20° to 21° W. - - -	—	1	10	12	4	2
21° — 22° W. - - -	—	1	6	8	9	1
22° — 23° W. - - -	—	$\frac{1}{2}$	10	9	8	1
23° — 24° W. - - -	1	4	10	15	7	3
24° — 25° W. - - -	$\frac{3}{4}$	2	10	19	8	1
25° — 26° W. - - -	1	2	10	20	5	2
26° — 27° W. - - -	$\frac{1}{4}$	3	10	22	5	1
27° — 28° W. - - -	$\frac{2}{3}$	2	12	25	8	2
28° — 29° W. - - -	2	2	12	17	7	$\frac{2}{3}$
29° — 30° W. - - -	1	1	10	15	5	—

TABLE 11.

This Table gives the bearing on which Lightning was seen in the various Lateral Strips. Only the bearings recorded as actually N., S., E., or W., have been given to those points.

Lateral strips, being 10° of Longitude by 1° of Latitude.	Number of Observations.	N.	N.Ely.	E.	S.Ely.	S.	S.Wly.	W.	N.Wly.	All round	No direction given.
9° to 10° N. - - - -	14	1	3	2	2	2	1	-	3	-	-
8° - 9° N. - - - -	9	-	-	1	3	2	1	-	2	-	-
7° - 8° N. - - - -	7	-	-	1	1	2	-	1	-	-	2
6° - 7° N. - - - -	12	-	2	2	2	1	3	1	1	-	-
5° - 6° N. - - - -	4	-	2	-	1	-	-	-	-	-	1
4° - 5° N. - - - -	1	-	1	-	-	-	-	-	-	-	-
3° - 4° N. - - - -	3	-	-	-	1	-	1	-	-	-	1
2° - 3° N. - - - -	-	-	-	-	-	-	-	-	-	-	-
1° - 2° N. - - - -	-	-	-	-	-	-	-	-	-	-	-
0° - 1° N. - - - -	-	-	-	-	-	-	-	-	-	-	-
Total for the month and how distributed -	50	1	8	6	10	7	6	2	6	-	4

The means of the various percentages in Table 9, compared with those for June, show that there has been a decrease in unsettled weather, but by comparing the percentages in the various strips it is shown that the decrease does not extend throughout the square, for thunder and lightning have decidedly *increased* between 9° and 10° N., and squalls and rain between 7° and 10° N., indicating the Nn. progress of the Doldrum.

Mist has decidedly increased between 2° and 7° N., where thunder, lightning, squalls, and rain have decreased.

Table 10 shows that there is more unsettled weather on the Wn. than on the En. side of the square, which may well be supposed as the Diagrams show that in June the Sly. wind was much more decidedly established on its En. than on its Wn. side, so that in July there was more conflict between Nly. and Sly. winds in its N.Wn. corner than elsewhere. Rain has absolutely increased on the Wn. side of the square since June, though it has decreased very much on the En. side. Where there has been the greatest decrease of rain there has been the greatest increase of mist.

Heavy squalls have not been so frequent as in June; between 4° and 10° N. they average one in every fourteen. Very heavy squalls were experienced between 7° and 8° N.; they are alluded to in the remarks of Table 3.

Table 11 shows that lightning was most frequently seen on some Sly., bearing down to 6° N., south of which very little was seen. Perhaps the meeting of the warm and cool air and water in about 5° N. may have caused the source of lightning to be so far south.

The following remarks on Weather are considered worthy of publication. They give the *various kinds* of lightning seen, and its direction, &c.

Latitude.	Sub-square.	Remarks on Weather. NOTE. A bar, thus —, separates the Remarks from different Logs.
9° to 10° N.	93	Constant rain for 14 hours.—Sheet l. and distant t. in South.
	94	Sun-dog* in the N.W.
	95	Constant rain for 15 hours.
	98	Waterspout to the Ed., trending to the S.Ed.
	99	Very quick flashes of vivid l. with heavy t. in the E.N.E., N.N.E., and N.W. for 4 hours.
8° - 9° N.	82	Sun-dog* in S.S.W.
	83	Sheet l. in S.E. at intervals of 8 minutes. 4 p.m., thermometer in the sun backed by a black ground 115°.
	85	Rain continued for 21 hours.
	86	Sheet l. in S.E.—6 p.m. 4th, four waterspouts in sight, one very large, lasted about 15 minutes.—A few flashes of sheet l. in W.N.W.
	87	Several waterspouts.
	88	A wind-dog* in the S.E.

* Also called by seamen Wind-dog or Wind-gall. It is a prismatic colouring generally seen near the horizon.

Latitude.	Sub-square.	Remarks on Weather. NOTE. A bar, thus —, separates the Remarks from different Logs.
7° to 8° N.	70	Wind-dogs.
	73	Lightning of a green colour.
	75	Showers rise in the S.S.W. and pass over the ship, when they are driven back by meeting the light N.N.E. breeze.
	76	Chain lightning.
	63	Loud t. and forked l. in S.W.
6° - 7° N.	64	A few flashes of sheet l.
	65	Double halo round the moon.
	66	A waterspout in N.E. lasted about ½ an hour.—Much pale sheet l. in N.W. to N. for 4 hours.—Sheet l. in East.
	67	Rain in torrents for 12 hours.
	52	A remarkable halo round the moon having prismatic colours.
5° - 6° N.	54	Not less than 12 inches of rain in 20 hours. (No gauge is mentioned.) Halo round the sun, diameter 30°.
	55	The rain all came up from N.E. although we had a nice breeze from S.W.
	57	Vivid flash of chain l. attended by one heavy clap of t.—Sheet l. in N.E.
4° - 5° N.	42	Dull halo round the moon.
3° - 4° N.	35	Sheet l. to the S.Ed.
1° - 2° N.	38	A dark haze round the horizon.
	16	Smoky appearance all round.

GENERAL REMARKS.

The following extracts have been made from the "Remarks" in various logs.

NATURAL HISTORY.

Latitude.	Sub-square.	Remarks on Natural History.
<i>Land Birds and Insects.</i>		
5° to 6° N.	54	<i>Land Birds</i> like Hawks flying to the N.Ed. NOTE.—This is the only remark on any creature from the land in July, and as land birds are generally too ready to settle on ships it seems doubtful whether these really were land birds.
<i>Cetacea.</i>		
8° - 9° N.	83	Saw a <i>Whale</i> going S.Ed.
	84	<i>Whales</i> seen.
	88	A few small <i>Whales</i> .
5° - 6° N.	52	Three <i>Sperm Whales</i> going South.
7° - 8° N.	75	A shoal of <i>Grampuses</i> going to the N.Wd.
5° - 6° N.	57	A shoal of <i>Grampuses</i> going to the Nd.
8° - 9° N.	84	Water covered with <i>Porpoises</i> and <i>Bottle-noses</i> .
9° - 10° N.	94	A shoal of <i>Blackfish</i> going to the Sd.
	97	A great school of <i>Blackfish</i> .

Latitude.	Sub-square.	Remarks on Natural History.
1° to 10° N.	- -	<i>Porpoises</i> were seen in sub-squares 98*, 83, 84, 85, 73 (twice), 73, 74, 76 (twice), 78, 63, 53, 59, 21, 27, 17. In s.-ss. 83 and 17 they were going to the S.Ed. in 85 to the Sd., in 74 to the N.Wd., in 63 to the Nd., in 59 to the Wd., in 21 to the Ed. In s.-s. 73 they were small and in shoals. The first figures of the sub-squares indicate that nearly all the cetacea were in the Nn. part of the square; in fact all excepting the porpoises in s.-ss. 21, 27, and 17. The same fact was noticed in June. This looks as if they liked the warm Ely. current.
		<i>Fish, &c.</i>
5° - 9° N.	- -	<i>Albicore</i> s were seen in s.-ss. 82, 73, 52, 54, 53; in 82 they were large; in 73 they were called <i>Tunny Fish</i> .
3° - 10° N.	- -	<i>Bonitos</i> were seen in s.-ss. 94, 98, 87, 50, 54, 44, 34.
1° - 10° N.	- -	<i>Dolphins</i> or <i>Coryphæna</i> were seen in s.-ss. 98, 78, 54, 34, 15.
0° - 10° N.	- -	<i>Flying Fish</i> were seen in thirty-eight sub-squares, being pretty equally divided throughout the square. They were very abundant in 94, 62, 21, 24, 11, and 12. They were small in 84, 60, 64, 51, 45, 49, 36, and 39. Eighteen of the thirty-eight observations were in the Nn. half of the square.
0° - 8° N.	- -	<i>Skipjacks</i> were seen in s.-ss. 75 (twice) and 09.
5° - 10° N.	- -	<i>Sharks</i> " " 94, 69, 50, large in 94, very large in 50, caught one six feet long in 69.
0° - 9° N.	- -	<i>Fish</i> (no names given) in sub-squares 86, 32 (twice), 04.
2° - 7° N.	- -	<i>Portuguese-men-of-war</i> " 65 large, 66, 32, 28.
		<i>Remarks.</i>
8° - 9° N.	83	In the night sea very bright; caught several <i>Fire cones</i> , none were caught in the day.
	85	Vast numbers of luminous <i>Zoophytes</i> in the ship's wake.
6° - 7° N.	62	Sea very luminous, large oval masses, resembling blue lights, visible about three feet below the surface.
5° - 6° N.	55	A broad finned <i>Sword-fish</i> alongside.
4° - 5° N.	44	21st, 1870. Passed through a shoal of <i>Bonitos</i> : there must have been thousands, and so closely were they packed that they tore the water into a white sheet of foam. At a distance they might have been mistaken for a reef flush with the water, having an area of about 100 square yards.
0° - 1° N.	07	Quantity of large <i>Physalia</i> . NOTE.—Nearly all fish seem to have been more frequent in the Nn. than in the Sn. part of the square, which seems to show that they preferred the warm Ely. to the colder Wly. current.
		<i>Sea Birds.</i>
0° - 10° N.	- -	<i>Stormy Petrels</i> (Mother Carey's Chickens) were seen in sub-squares 95, 52, 33, 36, 24, 27, 28, 09. In four of these instances only one was seen; in sub-square 33 a pair feeding in the wake, in 27 a few, in 28 several, in 09 plenty. These remarks are given to show that they were still very rare, and only abundant near St. Paul's rocks, which looks as if they were keeping near the shore and attending to their young. This opinion is confirmed by the remarks from the "Challenger" in August, though <i>Stormy Petrels</i> are not mentioned. (See the note to the remarks on Sea Birds in August.)
3° - 6° N.	- -	<i>Boobies</i> were seen in sub-squares 54 "one over ship," and 34 two.
0° - 9° N.	- -	<i>Birds</i> (supposed to have been Sea Birds) were seen in sub-squares 87, 74, 63, 48, 36, 21, 23, 24, 12, 15, 17, 18, 09, in 74 like large gulls flying to the S.W. Only one in each of sub-squares 63, 48, and 36. In 21 several large grey birds with long wings. In 23 at midnight, birds screaming near the ship, but not seen. In 24 a <i>Sea Hawk</i> . In 12 an immense number of birds (<i>Shearwaters</i>) from N. to S. In 15 large numbers of sea birds. In 18 flocks of small birds.

FALLING STARS.

There are 27 entries of Falling Stars, distributed over 10 years between 1855 and 1871, of these five were in each of the years 1858 and 1870, four in 1867, three in each of the years 1859, 1861, and 1862. The following remarks seem worthy of extraction:—

Sub-Square.	Hour.	Day.	Year.	Remarks on Falling Stars.
96	Midnight	29	1855	Stars shooting in the S.Ed.
45	8 p.m.	15	1857	Stars shooting S.Wly.
94	10 p.m.	9	1858	Stars shooting to W., S.S.E., and E.S.E.
77	Midnight	31	1859	Many shooting stars.
74	1 a.m.	15	1861	Numerous shooting stars to the S.Wd., falling very low.
62	Midnight	15	1861	Stars shooting to the Sd. and Wd.
32	8 p.m.	31	1861	Stars shooting from S.Wd.
44	—	10	1862	Stars shooting mostly from W. towards E.
95	9.30 p.m.	4	1867	The most beautiful meteor I ever beheld. It started from a high altitude to the Nd. and shot in a S.Wly. direction, leaving behind a brilliant line of light which lasted quite four seconds; when it reached the altitude of about 20° it burst with a grand explosion, the fiery atoms radiating from a centre and giving a most surprisingly beautiful effect.
04	2 a.m.	1	1869	A shooting star traversed 25° of the zenith from S.E. towards N.W., having a wavy track and bursting at its termination into a number of coruscations.
23	8 p.m.	19	1870	Stars shooting to S.E.
25	10 p.m.	20	1870	Stars shooting to S.E.
34	2.45 a.m.	22	1870	Stars shooting from the S.W. quarter towards the E.
35	9 p.m. Greenwich time.	28	1870	A star shot from about 2° W. of Antares through the Milky Way in a S.Ely. direction and disappeared when about 15° from the horizon. I think it was one of the most magnificent I ever saw; it was in sight eight seconds, and as it rushed along it seemed to be emitting sparks of fire as well as leaving a long bright trail.
39	4 a.m.	19	1871	Several small shooting stars in N.E., one in S.E.

* One dot under a sub-square indicates that the creatures were abundant; two that they were very abundant, &c.

TEMPERATURE OF RAIN AND AIR.

Sub-Square.	Temperature of Rain.	Temperature of Air.
93	76.0	78.6
96	74.5	77.2
85	74.0	74.5
	73.0	73.9
86	74.0	77.3
	73.5	74.7
87	74.0	76.0
88	76.0	77.0
72	75.0	75.8
73	73.5	76.0
75	72.5	76.2
	72.9	76.0
76	75.0	75.0
63	75.0	77.0
55	72.0	76.0
	15) 60.9	15) 91.2
	74.06	76.08
		Difference 2.02.

Sub-square.	VARIOUS.
42	9 a.m., 31, 1859. Passed a tree with two branches covered with barnacles. 11 a.m. Passed within 12 fathoms of a dark spot about 30 feet in extent, of a rugged square shape, with a quantity of tangled weed near the surface. Thought at first it was the shadow of a cloud, but when close to distinctly saw the large substance and the tangle. The sun being clear and bright, it seemed to be about 4 fathoms below the surface. Not being satisfied, hove the ship about, intending to sound on it, but the sky became overcast, and we could not distinguish it again. Lat. 4° 4' N., long. 22° 25' W.
11	8 p.m. 11th, 1860. Comet visible ; tail towards E.S.E.
05	Quantity of <i>Cuttlefish</i> bone floating.

BEST ROUTES FOR CROSSING THE EQUATOR.

Appendix B. shows that in July the mean force of all winds is decidedly stronger in the Wn. than in the En. half of Square 39. In the En. half of the square there is much more S.Wly. and N.Wly. wind than in the Wn.

The following Table may be usefully consulted with the July Table of Appendix B. It shows the three points of each quarter of the Compass from which the wind prevails in each half of Square 39, and proves that the N.Ely. and S.Ely. winds of the Wn. half are more Ely. than those of the En. half. Also that the S.Wly. winds which are common in the Sn. part of the Square are generally from S.W. or more Sly. points; whilst the N.Wly. winds in the same part are N.N.W. or N. by W.

TABLE 12.

The Direction of the three Prevailing Winds of each quarter of the compass, in each half of Square 39. They are in the order of their prevalence. A dash under a letter or figure indicates extreme prevalence.

Latitude.	N. to E. b. N., or N.Ely. Winds.		E. to S. b. E., or S.Ely. Winds.		S. to W. b. S., or S.Wly. Winds.		W. to N. b. W., or N.Wly. Winds.	
	Wn. half. 25° to 30° W.	En. half. 20° to 25° W.	Wn. half. 25° to 30° W.	En. half. 20° to 25° W.	Wn. half. 25° to 30° W.	En. half. 20° to 25° W.	Wn. half. 25° to 30° W.	En. half. 20° to 25° W.
	Points from North.	Points from North.	Points from South.	Points from South.	Points from South.	Points from South.	Points from North.	Points from North.
18° to 20° N.	4, 3, 2	2, 3, N	8, 7, 6	8, 6, 7	- - -	S, 4, -	1 - -	2, 6, 1
16° - 18° N.	4, 3, 5	2, 4, 3	8, 7, 6	8, 7, 2	6, - -	3, S, 4	1, 5, 6	1, 3, 6
14° - 16° N.	4, 3, 5	4, N, 2	8, 7, 6	8, - -	6, 3, -	4, - -	1, 6, 3	1, 3, 5
12° - 14° N.	2, 3, 4	2, 1, N	8, 7, 6	4, 8, 1	S, 3, 1	4, 2, S	2, 1, 3	1, 2, 4
10° - 12° N.	4, N, 1	2, 3, N	8, 7, 2	8, 2, 4	4, 3, 5	4, 2, S	1, 2, 3	2, 8, 1

The accompanying Chart for July, and the prevailing-wind-arrows on the Diagram in its lower right-hand corner show that Sly. winds prevail throughout SQUARE 3, but that they are very weak in its N.Wn. corner. Before consulting the Chart it will be well to read the paragraph on p. 9, which precedes the remarks for January. The Diagram also shows that the direction of the prevailing wind gradually curves from S.E. near the Equator to South between 6° and 10° N.

The red sections on the Chart and the arrows on its Diagram show that there is a pretty strong Ely. current between 4° and 10° N., whilst a strong Wly. current prevails from the Equator to 4° N. Table 4 shows that the Wly. current may amount to 72 miles in 24 hours, and averages 40 miles to the N.Wd. between 1° and 2° N.

Appendix C. shows that in July the prevailing wind is about a point more Sly. between 33° and 35° W. in Square 303, than it is further East. This is well illustrated by running a pencil down each table, making it pass through the largest percentage of wind in each degree of latitude: that in the Wn. part will be seen to run down about

S.E. $\frac{1}{2}$ S. or a point more to the right (or Southward) than that in the En., which comes down about S.E. $\frac{1}{2}$ E. By meaning the mean forces of all winds in each part it is shown that the En. part has slightly the strongest; but on comparing them for each degree of latitude it is shown that though the En. part has very decidedly the strongest wind in the Sn. half, the contrary is the case in the Nn. half of the square.

From the above facts it seems right that the *Outward-bound* ship should pass to the Wd. of the Cape Verd Islands, and when the wind draws to S. stand to the S.Ed., not fearing the effect of the Ely. current, as her Captain may feel sure that the wind will draw to the S.Ed. as she gets to the Sd., and that the current will be very strong to the Westward after passing 4° N. When no Southing can be made on the Starboard tack it will be well to tack to the S.Wd., but the parallel of 6° N. should not be passed to the Westward of 20° W., and it seems advisable to be several degrees further E. before crossing it, for we have seen that besides the strong Wly. current, the winds near Cape St. Roque are very Sly. in July and there is a good deal of sea there.

The iron ship "Gilbert Thompson" of Liverpool, Capt. Blake, was in 0° 26' N., 29° 59' W. on the 18th of July; on the 19th, 1° 44' S., 31° 0' W.; on the 20th, 3° 33' S., 31° 22' W.; on the 21st, 5° 26' S., 33° 22' W.; on the 22nd, 6° 51' S., 34° 17' W.; on the 23rd, 7° 33' S., 34° 24' W.; on the 24th, 8° 16' S., 34° 36' W.; on the 25th, 9° 0' S., 34° 43' W.; on the 26th, 10° 37' S., 35° 39' W. She had moderate to fresh S.Ely. breezes until the 22nd, when she had heavy squalls from S. to S.E. and constant rain for more than 24 hours, with a short deep sea from E.S.E. After the 22nd, the wind was fresh from S.S.E., drawing to S.E. by S. the latter end of the 24th; on the 25th, the swell was from E. by S., S.E., and S.S.W. Near the Equator she had 40 miles of Wly. current in 24 hours, but much less or none afterwards. She does not give the "direction of the ship's head," or hours of tacking, but it is evident that she must have spent much time on the starboard tack, standing to the Ed. A worse sailing ship would have been much more bothered to the Sd. of Cape St. Roque, and there is little doubt she would have done better by crossing the Equator several degrees further to the Ed.

The *Homeward-bound* ship will find better winds on the En. than on the Wn. side of Square 3, especially in its Nn. part. But as Square 39 has better winds on its Wn. than on its En. side it may be well to pass the parallel of 10° N. in about 25° W.

AUGUST.

Barometer.—The isobars (see the Diagram on the lower right-hand corner of the Chart) show that the highest pressure still continues in the S.En. corner of the square, whilst the lowest is in its N.Wn. corner. In the Sn. part of the square the wind seems to blow from the highest, directly towards the lowest pressure, whilst in the Nn. part it seems to leave the lowest pressure rather to the left, following more nearly the rule of Buys Ballot's Law for the Nn. hemisphere. This was also the case in July.

The highest mean pressure in the lateral strips (30.032) is still between 0° and 1° N., whilst the lowest (29.989) is between 9° and 10° N.

Pressure has decreased generally since July, the change in the mean being $-.015$ in.; by comparing the changes in the various strips it is found to amount to $-.020$ in., between 8° and 10° N., but keeps pretty uniformly to about $-.014$ in. between 8° N. and the Equator. The Mean for the month is 30.010.

The mean pressures in the vertical strips compared with those for July show that the decrease of pressure has been very uniform in longitude, and it is the same with the change of temperature of both air and sea.

Air Temperature.—The means of Air Temperatures in the lateral strips, compared with those for July, show a very uniform decrease of about 0.4 between 6° N. and the Equator; between 6° and 8° N. there has been a slight *increase* of nearly 0.3, whilst between 8° and 10° N. there has been a slight *decrease* of nearly 0.2. It will be seen that the changes in the temperature of the sea correspond to these in a remarkable way. By referring to Tables 6 and 9 it will be seen that clouds and rain have decreased very much between 6° and 8° since July, which, no doubt, accounts for the slightly increased temperature of air and sea in that zone. The Mean Temperature for the Square (77.8) shows an average decrease of 0.2 since July. It is remarkable to find how the prevailing Sly. wind of August counteracts the influence of the sun's southern progress, and succeeds in making the square slightly cooler than it was in July. August is the coolest month in the year, and the mean temperature for s.-s. 00, in its S.En. corner, is down to 74.6. It has already been remarked that the coldest air due to the N.E. Trade is experienced in February; in that month s.-ss. 95 and 96 have a mean air temperature of 74°. The Vertical Strips show that the slight decrease of temperature since July has been very uniform in longitude. A glance at the isotherms in the lower right-hand corner of the Chart shows how uniform the temperature of the air continues between 10° and 4° N., and how it decreases between 4° N. and the Equator. They also show the great agreement between the air and sea in their changes of temperature, though the sea continues about 1° warmer than the air.

Dry and Damp Bulbs.—The least mean difference between dry and damp bulbs ($2^{\circ}7$) is between 9° and 10° N. The greatest ($4^{\circ}4$) between 4° and 5° N.; between 0° and 2° N. it is only $3^{\circ}8$; this smaller difference being no doubt caused by the moisture which at this season is found in the air over the cold water of the Wly. current, even though there is very little cloud and no rain there; it has already been remarked upon in June and July. By comparing the mean difference of each lateral strip with that for July, it is shown that the difference has increased $0^{\circ}2$ between 6° and 8° N. where the air is warmer, and the amount of cloud and rain has greatly decreased. In the Sn. part of the square the difference has slightly decreased since July, so that the Mean for the whole square ($3^{\circ}7$) shows no change. The vertical strips show that the difference has increased on the Wn. side of the square, and slightly decreased on its En. side. By comparing the Tables 10 of July and August, it is shown that rain has decreased much more on the Wn. than on the En. side of the Square.

Sea Temperature.—The isotherms of sea temperature still agree remarkably with those of the air, but keep about 1° higher. The means of the lateral strips compared with those for July show that there has been a decrease in sea temperature of nearly $0^{\circ}3$ between 8° and 10° N.; from 7° to 8° N. it has *increased* $0^{\circ}1$ (we have remarked on the cause of this in dealing with the air temperature); between 6° and 7° N. there has been no change, whilst from 0° to 6° N., there has been an average decrease of $0^{\circ}5$; it being nearly $0^{\circ}7$ between 0° and 3° N., and only $0^{\circ}3$ between 4° and 6° N. The isotherms show best how uniform the temperature of the Ely. current is between 4° and 8° N., whilst that of the Wly. current decreases very suddenly on passing from 4° N. to the Equator. The air isotherms agree in this respect with those of the sea, but they do not show so great a difference, the sea differing 4° , and the air only 3° between 0° and 4° N. The Mean Sea Temperature for the whole square is $78^{\circ}7$, showing a decrease of $0^{\circ}3$ since July, the change agreeing very nearly with that of the air.

Specific Gravity.—The lowest specific gravity (1.0265) is between 9° and 10° N., and again between 6° and 7° N.; it increases to 1.0268 between 8° and 9° N., and to 1.0271 between 5° and 6° N., from which zone it decreases to 1.0267 between 1° and 2° N. By comparing the changes since July we find that there has been a considerable increase between 5° and 8° N., in which neighbourhood it has already been remarked that rain has greatly *decreased*. The greatest decrease of specific gravity has taken place between 9° and 10° N. where the percentage of rain has increased.

The Mean for the whole square (1.0268) shows a slight increase since July.

WIND.

TABLE 1.—LATERAL STRIPS.

Lateral Strips. 10° of Longitude by 1° of Latitude.	No. of Observations.	Mean Force of Strip.	N. to E. by N. or N.Ely.		E. to S. by E. or S.Ely.		S. to W. by S. or S.Wly.		W. to N. by W. or N.Wly.		Variables.		Calms.	Prevailing Wind.		Strongest Wind.*	
			%	Mean Force.	%	Mean Force.	%	Mean Force.	%	Mean Force.	%	Mean Force.	%	No. of Observations. Direction.	Mean Force.	No. of Observations. Direction.	Mean Force.
9° to 10° N. -	313	3.4	3	2.9	10	2.8	59	3.9	14	3.5	8	2.5	6	S.W. ³⁷ by S.	4.0	W. ¹² by N.	4.3
8° - 9° N. -	354	3.7	—	—	8	3.2	75	3.9	9	3.3	5	2.8	3	S. ⁴³ by W.	3.8	W. ²³ S.W.	4.3
7° - 8° N. -	315	3.8	—	—	16	3.7	74	3.9	8	3.6	1	2.9	1	S. ⁵³	4.3	S. ⁵³	4.3
6° - 7° N. -	286	4.1	1	2.0	31	4.1	63	4.3	2	4.1	2	3.8	1	S. ⁵⁶	4.3	S. ⁴⁰ by W.	4.6
5° - 6° N. -	272	4.3	—	—	47	4.5	49	4.4	2	2.7	1	3.0	1	S. ⁶⁷ by E.	4.6	S. ¹⁶ S.W.	4.7
4° - 5° N. -	223	4.1	—	—	68	4.1	30	4.1	—	—	2	3.1	—	S. ⁵⁰ by E.	4.4	S. ⁵⁰ by E.	4.4
3° - 4° N. -	267	4.1	—	—	71	4.1	28	4.3	—	—	—	—	1	S. ⁵⁹ S.E.	4.1	S. ¹² by E.	4.5
2° - 3° N. -	273	4.2	—	—	86	4.2	13	4.1	—	—	1	4.0	—	S. ⁶⁵ S.E.	4.2	S. ²⁰ by E.	4.6
1° - 2° N. -	234	4.1	1	4.0	90	4.1	9	3.6	—	—	—	—	—	S. ⁵⁶ by S.	4.3	S. ⁵⁶ by S.	4.3
0° - 1° N. -	229	4.1	4	3.9	95	4.1	—	—	—	—	1	1.8	—	S. ⁵⁴ S.E.	4.4	S. ⁵⁴ S.E.	4.4

TABLE 2.—VERTICAL STRIPS.

Vertical Strips. 10° of Latitude by 1° of Longitude.	No. of Observations.	Mean Force of Strip.	N. to E. by N. or N.Ely.		E. to S. by E. or S.Ely.		S. to W. by S. or S.Wly.		W. to N. by W. or N.Wly.		Variables.		Calms.	Prevailing Wind.		Strongest Wind.*	
			%	Mean Force.	%	Mean Force.	%	Mean Force.	%	Mean Force.	%	Mean Force.	%	No. of Observations. Direction.	Mean Force.	No. of Observations. Direction.	Mean Force.
20° to 21° W.	271	4.2	1	4.0	45	4.1	50	4.3	2	4.0	2	4.5	—	S. ⁴⁶ S.E.	4.3	S. ⁸ W. by W.	4.8
21° - 22° W.	326	4.1	—	—	48	4.0	47	4.2	4	3.3	1	2.0	—	S. ⁵⁶ by E.	4.3	S. ³⁴ by E.	4.7
22° - 23° W.	326	4.1	1	3.7	48	4.1	47	4.3	1	3.3	2	2.9	1	S. ⁵³	4.1	S. ⁶ W. by W.	5.0
23° - 24° W.	385	4.0	1	4.0	47	4.2	45	4.0	3	3.7	3	3.0	1	S. ⁶⁶	4.2	S. ⁸ by E.	4.8
24° - 25° W.	391	4.0	—	—	48	4.1	42	4.2	6	3.2	2	2.8	2	S. ⁵² S.E.	4.0	S. ²⁰ W.	4.6
25° - 26° W.	371	3.8	1	4.1	43	4.1	43	3.7	6	3.4	4	3.2	3	S. ⁴⁴	4.1	S. ⁴⁰ by E.	4.4
26° - 27° W.	250	3.8	1	3.0	49	4.1	39	3.7	7	3.1	2	1.9	2	S. ³³ by E.	4.3	S. ³³ by E.	4.3
27° - 28° W.	207	3.9	2	3.3	45	4.1	46	3.8	3	4.4	2	1.8	2	S. ²⁴ by E.	4.0	S. ¹⁸ S.E.	4.5
28° - 29° W.	111	3.8	4	2.5	54	4.1	28	4.2	5	4.3	4	1.9	5	S. ²¹ by S.	4.1	W. ³ S.W.	5.0
29° - 30° W.	128	4.1	—	—	63	4.2	24	4.4	6	3.4	5	3.2	2	S. ¹⁸ by E.	4.7	S. ⁸ W. by	4.9

* In recording the Strongest Wind in a Strip, weight has been given to the number of observations; otherwise the direction and force of a single squall would frequently appear in this column.

By comparing the means of the percentages in the *lateral* strips (Table 1) with those for July, the following results are shown for the whole square.

N.Ely. wind	1 °/	and decreased	2 °/	since July.
S.Ely. "	52 "	"	5 "	"
S.Wly. "	40 "	and increased	9 "	"
N.Wly. "	4 "	"	1 "	"
Variables	2 "	and decreased	1 "	"
Calms	1 "	"	2 "	"

The mean of the mean forces of all winds in the 10 strips of Table 1 is 4.0, which shows an increase of 0.2 in the mean force for the Square since July; this is the highest mean force attained during any month of the year. By comparing the mean forces for each strip it is shown that the increase is entirely confined to the Nn. half of the Square. Between 8° and 10° N. it amounts to nearly 0.8 of Beaufort's scale, and gradually decreases to 0.2 between 5° and 6° N.; between 3° and 5° N. there is no change of force, but between 0° and 3° N. it has *decreased* nearly 0.2 of Beaufort's scale. Here is a case of a Sly. wind increasing in force at its Nn. extreme and decreasing to the Sd. as if the supply of air in the S. was failing, so that the Doldrum to the Nd. seems to have drawn air out of Square 3 which had not been replaced by other from the S.; this is probably related to the fall of the barometer in the square. In August the Doldrum seems to be at its furthest N. latitude, and Appendix B. leads to the supposition that it is then in about 12° or 13° N. By considering the change in percentage and force of each wind in each strip, an increase of nearly 20% is found in S.Wly. winds between 7° and 10° N., where there has also been a slight increase in the percentage of N.Wly. winds; these Wly. winds have also increased considerably in force since July. S.Ely. winds have increased in force in the Nn., and decreased in the Sn. half of the square. The unpublished Chart of 1° sub-squares shows that 7 out of 8 observations of the N.Ely. wind between 9° and 10° N., and nearly two-thirds of the N.Wly. wind observations in the same zone were on the Wn. side of the Square; proving that the greater tendency for Nly. winds, which had prevailed in other months in its N.W. corner, still continued.

By consulting the Diagram in the lower right-hand corner of the August Chart it will be seen how the prevailing wind gradually curves from S.E. in the Sn. to S.W. in the Nn. part of the square; its relation to the direction of the isobars has already been remarked on when speaking of the barometer.

Table 2 and the published Chart show that there are more N.Ely. and N.Wly. winds and calms on the Wn. than on the En. side of the square; also that the Mean Force of all winds is greater on its En. than on its Wn. side excepting in the zone between 0° and 2° N.

In considering the wind data for August it will be well to bear in mind that this is the month in which the largest number of West India hurricanes occur, and it is also

the month which has the largest percentage of and strongest Sly. or S.Wly. winds in the Nn. part of Square 3, which are about to give way to N.Ely. winds as the Doldrum returns to the Sd. It will also be seen that the least difference of dry and damp bulbs which is experienced for the whole year (2°.7) lies between 9° and 10° N. in August, so that the S.Wly. wind is nearly saturated with moisture, accounting to some extent for the large amount of rain and low pressure at the centre of a hurricane where the moisture is quickly condensed as the air rises.

TABLE 3.

Latitude.	s.-s.	Winds, Force 7 or upwards, but not Squalls.	Direction of Squalls and Heavy Squalls. (All Squalls Force 7 or upwards are considered to be heavy.) (All Squalls on either side of N., S., E., or W., are given to their respective quarters, so that there are fewer from the above-named points than from the quarters.)										s.-s.	REMARKS. NOTE. A bar, thus—, separates the Remarks from different Logs. The dates of Trade limits are in the order of the sub- squares in which they occurred, beginning with the most Eastern one.			
			N.	N.E.	E.	S.E.	S.	S.W.	W.	N.W.							
			Heavy.	Heavy.	Heavy.	Heavy.	Heavy.	Heavy.	Heavy.	Heavy.							
9° to 10° N.	90	W.S.W. 8	-	-	-	-	-	-	-	8	1	3	-	2	-	93	A sudden squall from W.N.W. with torrents of rain. All squalls from N. by W. ; wind W. by N., 6.— Wind in squall W.N.W. to S.W. force 6 to 7. Light baffling airs and calms (2 entries). " all round the compass, and calms. Clouds have a leaden appearance and squalls are very violent from the S.Wd.
		" 7														95	
	91	S.S.W. 7														97	
	92	S.W. 9														98	
		" 8														99	
		S.S.W. 7															
	98	S.Wly. 7															
	99	S.W.b.S. 8															
		S.W. 7															
8° - 9° N.	82	S.S.W. 7	-	-	-	-	-	-	-	9	4	-	-	1	-	87	9.15 A.M., 16th, wind shifted from S.W. by S. to N.E. by N. ; went round Nly. twice, and at 10.30 A.M. was at S.W. by W.—Wind steady in force, but varying from S.W. by S. to S. by E. Squalls from S.S.W. wind veering in them.— Hard squall from the Wd. Constant rain with wind very baffling : could not get to the Sd. on either tack.
	88	S.Wly. 7 2 entries.															
7° - 8° N.	—	- - -	-	-	-	-	-	-	3	7	-	-	1	2	1	74	Wind shifted suddenly from W.N.W. 4 to S.S.W. 4. Stormy Sly. breeze with frequent gusts. Wind went round the compass in 10 minutes. Sudden shift of wind from S.E. to N.E.
	—	- - -	-	-	-	-	-	-	-	-	-	-	-	-	-	77	
6° - 7° N.	60	S. b. E. 7 2 entries.	-	-	-	-	-	-	6	-	3	1	-	1	-	60	Nn. limit of S.E. Trade, 19th, 6th, 8th, 1st. Hot gusts, wind S. by E. Lost S.E. Trade, and got S.W. monsoon (wind S. by W). Squalls from the Nd., and all round the compass with heavy showers.
	61	W.S.W. 7														63	
	62	S. b. W. 7														65	
	66	S.W.b.S. 7														68	
5° - 6° N.	50	Sly. 7 9 entries.	-	-	-	-	-	2	-	5	-	4	-	-	1	54 to 56	Nn. limit of S.E. Trade on 1st. 29th. Sly. wind flying about, 2 or 3 points every four hours; tacked six times in 24 hours trying to get to the Sd. Gusty from the S.Ed. Wind light (apparently S.Wly.) with thick drizzling showers coming from the Nd.
	51	Sly. 7														51	
	51	4 entries.														54	
4° - 5° N.	—	- - -	-	-	-	-	-	2	-	1	-	-	-	-	-	56	
	—	- - -	-	-	-	-	-	-	-	-	-	-	-	-	-	41	
	—	- - -	-	-	-	-	-	-	-	-	-	-	-	-	-	40	
	—	- - -	-	-	-	-	-	-	-	-	-	-	-	-	-	42	
	—	- - -	-	-	-	-	-	-	-	-	-	-	-	-	-	45	

TABLE 3—continued.

Latitude.	s.-s.	Winds, Force 7 or upwards, but not Squalls.	Direction of Squalls and Heavy Squalls.								s.-s.	REMARKS. NOTE. A bar, thus—, separates the Remarks from different Logs. The dates of Trade limits are in the order of the sub- squares in which they occurred, beginning with the most Eastern one.						
			(All Squalls Force 7 or upwards are considered to be heavy.) (All Squalls on either side of N., S., E., or W., are given to their respective quarters, so that there are fewer from the above-named points than from the quarters.)															
			N.	N.E.	E.	S.E.	S.	S.W.	W.	N.W.								
			Heavy.	Heavy.	Heavy.	Heavy.	Heavy.	Heavy.	Heavy.	Heavy.								
3° to 4° N.	33	Sly. 7 3 entries.	—	—	—	—	1	1	—	—	1	—	—	—	—	31	Wind variable from S.S.E. to S.S.W. (3 entries). —Wind puffy.	
																32	Heavy cum. driving over head to the W.S.W., light squalls in the passing clouds. (The wind logged was S. by E. 5.)—Wind variable from S.S.E. to S.S.W.	
																	35	Wind very unsteady in strength and direction.
2° - 3° N.	29	S.E. b. E. 7	—	—	—	—	—	1	—	—	—	—	—	—	—	—	23 & 24	Nn. limit of S.E. Trade, on 14th and 2nd.
																	21	Gusty.
																	22	Puffy.
																	24	"
																	26	Wind very unsteady, ship making W. on port and East on starboard tack.
1° - 2° N.	—	- - -	—	—	—	—	—	—	—	—	—	—	—	—	—	—	13	Wind variable from S.S.E. to S. by W.
0° - 1° N.	04 05	S.E. 7 S.E. b. E. 7 2 entries.	—	—	—	—	—	—	—	—	—	—	—	—	—	—	03	Nn. limit of S.E. Trade on 5th.
																	00	Wind very baffling from E.N.E. to S.E.
																	04	Wind variable from S. by W. to S.E. by S. (2 entries).
																	07	Squally appearances.
Sum -	-	37, all from some Sly. direction.	—	—	—	—	—	6	1	15	—	32	6	3	2	6	1	

NOTE.—It will be seen that nearly all the strong winds in the Nn. half of the square were S.Wly.; from 3° to 6° N. they were Sly.; whilst south of 3° N. they were S.Ely., showing that they agree with the prevailing winds in the gradual change from S.E. to S.W. between the Equator and 10° N. (see the Diagram on the Chart.) The second figures of the sub-squares show that three-quarters of all strong winds were in the En. half of the square, but as about 60% of all observations were taken in its En. half, the preponderance is not so great. 30 out of the 37 strong winds were in the Nn. half of the square. The strong S.Wly. gales experienced between 9° and 10° N. considered in connection with the strong N.E. winds between 16° and 20° N. in August (see Appendix B), seem to indicate that the breeding place of West India hurricanes lies between them; and as the N.E. winds of Square 39 are much lighter on its En. than on its Wn. side, it seems probable that the greatest strength of N.E. and S.W. winds may come into collision further W. still, say in Square 40.

Since July the number of strong winds of force 7 or upwards has increased by more than half, and there are 72 instead of 62 entries of squalls from various directions. There are no N.Ely. or Ely. squalls; S.Ely. have decreased from 22 to 7, whilst Sly. and S.Wly. have nearly doubled. Wly. and especially N.Wly. have also very decidedly increased in number since July; they are all in the Nn. part of the Square. The remarks seem to show that the wind vacillated very much between S.S.E. and S.S.W., causing very much trouble and tacking to ships bound to the Sd.

CURRENTS.

TABLE 4.

LATERAL STRIPS.

Lateral Strips. 10° of Longitude by 1° of Latitude.	No. of Observa- tions.	Mean Rate.	N. to E. by N. or N.Ely.		E. to S. by E. or S.Ely.		S. to W. by S. or S.Wly.		W. to N. by W. or N.Wly.		None.	Prevailing Current.		Strongest Current.*	
			%	Mean Rate.	%	Mean Rate.	%	Mean Rate.	%	Mean Rate.		No. of Observations.	Mean Rate.	Direction.	Rate.
9° to 10° N.	27	17	30	22	48	18	4	8	7	19	11	⁷ E.	19	N.E. by N.	35
8° - 9° N.	22	20	41	25	41	20	4	13	5	14	9	E. by N.	27	N.N.E.	51
7° - 8° N.	45	19	40	24	36	22	4	18	7	9	13	⁷ E.	17	E. by S.	60
6° - 7° N.	43	17	30	23	39	21	5	18	7	7	19	¹⁰ E.	26	E. by N.	53
5° - 6° N.	42	12	40	15	24	18	10	10	5	13	21	N.E. by E.	15	N.E. by N.	30
4° - 5° N.	38	12	26	18	11	11	11	18	26	18	26	E.N.E.	13	N.N.E.	29
3° - 4° N.	53	18	6	9	4	10	26	18	51	23	13	N.W. by W.	20	N. by W.	51
2° - 3° N.	48	19	15	13	4	9	19	16	56	24	6	W. by N.	28	N.W.	65
1° - 2° N.	59	20	5	25	3	10	24	28	56	21	12	¹³ W. by N.	23	W.	57
0° - 1° N.	47	20	6	15	4	17	19	28	58	23	13	⁶ W.	30	W. by S.	51

TABLE 5.

VERTICAL STRIPS.

Vertical Strips. 10° of Latitude by 1° of Longitude.	No. of Observa- tions.	Mean Rate.	N. to E. by N. or N.Ely.		E. to S. by E. or S.Ely.		S. to W. by S. or S.Wly.		W. to N. by W. or N.Wly.		None.	Prevailing Current.		Strongest Current.*	
			%	Mean Rate.	%	Mean Rate.	%	Mean Rate.	%	Mean Rate.		No. of Observations.	Mean Rate.	Direction.	Rate.
20° to 21° W.	46	20	28	23	24	21	15	27	18	27	15	⁶ W. by S.	29	E. by S.	60
21° - 22° W.	43	16	26	20	16	15	12	13	32	20	14	⁵ E.	17	W. by N.	35
22° - 23° W.	54	17	23	20	9	21	11	30	35	21	22	W. by N.	23	N.W.	65
23° - 24° W.	64	19	22	18	17	21	17	23	33	22	11	⁷ W.N.W.	30	W.N.W.	48
24° - 25° W.	71	15	26	19	18	14	17	22	25	16	14	⁶ W.	19	N.N.E.	51
25° - 26° W.	52	17	15	24	23	19	19	14	31	19	12	W. by N.	27	N.E.	51
26° - 27° W.	43	19	14	17	23	19	9	20	40	27	14	³ W. by N.	38	W.	57
27° - 28° W.	19	13	16	12	21	23	5	13	26	23	32	² N. by W.	15	W.N.W.	48
28° - 29° W.	15	19	13	22	27	12	7	13	53	23	—	⁴ W. by N.	26	W. by N.	43
29° - 30° W.	17	19	23	19	—	—	18	14	53	23	6	³ W.	25	W.	34

* The Strongest Current in each Strip is here given, as it is important to the Navigator to know the extreme to which he is liable.

Table 4 shows that Wly. currents still prevail between the Equator and 4° N., though they are not so strong as they were in July. Between 4° and 5° N. there is 37% of Ely. current, and the same of Wly., leaving 26% of No Current, the largest amount in any strip in the Square, so that this zone seems to be the mean position of the line which joins the Ely. and Wly. currents in August. To the Nd., between 5° and 6° N., there is 64% of Ely. current, gradually increasing to 80% between 8° and 10° N., whilst to the Sd. between 3° and 4° N., there is 77% of Wly., which increases to 80% between 1° and 2° N.

By comparing the Mean Rates of all Currents in the various strips with those for July, it is found that they have increased between 8° and 10° N., which is chiefly due to an increased speed in the N.Ely. current. This might have been expected considering the great increase in percentage and force of the S.Wly. wind there. To the Sd. of 8° N. the mean force of all currents has decreased.

Table 5 and the prevailing current arrows on the Diagram in the lower right-hand corner of the Chart show that N.Ely. currents are more common on the En. than on the Wn. side of the Square.

The low temperature of the Wly. and uniform temperature of the Ely. current still prevail; these facts are very clearly shown by the sea isotherms on the Diagram.

Current rips were most frequently remarked upon between 8° and 9° N., where they were recorded 8 out of the 30 times in the whole Square. Between 1° and 3° N. they were remarked on 12 times. The remarks on currents show that Ely. prevailed most decidedly to the Nd., and Wly. to the Sd. of 5° N.

The following remarks seem worthy of extraction :

Latitude.	Sub-square.	Remarks on Currents. NOTE. A bar, thus —, separates the Remarks from different Logs.
8° to 9° N.	82	Passed through several current rips, extending in a line as far as the eye could reach, from W.N.W. to E.S.E. Note.—It was calm at the time of observation, but the wind had been S.S.Wly., and the calm was followed by a similar wind, so the current rip seems to have been at right angles to the prevailing wind.
	84	Passed through a very strong ripple for half an hour, afterwards very smooth water. (Wind light S.Wly.)
	85	Sea very boisterous; two long swells, apparently broken by a strong current, making a perfect boil. Sea very boisterous, toppling over violently to the S.Ed., but no S.Ely. swell. (Wind S.Wly.)
7° - 8° N.	71	Several smooth patches in the sea.
6° - 7° N.	63	Remarkably strong current in last 24 hours, N. 40° E. 51 miles, accounting for the sea being so broken and boisterous. (The wind was fresh from S.S.E.)—Irregular swell as if caused by current.
	67	Strong rippings, raising sea in heaps, and toppling it over to the Ed. very violently. (Wind and swell from S.W.)
5° - 6° N.	54	Strong rippings.—Water very noisy.
4° - 5° N.	44 & 45	Sea very noisy.

Latitude.	Sub-square.	Remarks on Currents. NOTE. A bar, thus —, separates the Remarks from different Logs.
2° to 3° N.	23	9.30 a.m., 28th, 1857. Tide wave came up from the S., visible on the horizon from E. to W., and very much like the Calcutta "bore." (Wind S. 4).—Tide rips extending E. and W. (Wind Sly.)
1° - 2° N.	24	The water bubbling and boiling, as if on the verge of a current. (Wind S. 5.)
	12	Sea smooth, with strong rippings toppling over to W.N.W. (Wind S.E. 4.)
	16	5th, 1860. This current (N. 87° W. 57 miles) and the Ely. one to the Nd. seem to have little or no margin between them.
	17	1st., 1870. The current has been strong to the Wd. for the last five days (between 5° 30' N., 22° W., and 1° 41' N., 27° 44' W.); it is sweeping us to the Wd. frightfully fast. (Note. This ship did not have the Wly. current quite so strong after passing the Equator, but she was bothered off St. Roque, and only reached 10° South on the 12th, though a smart ship and well handled.)

SEA.

The sea was remarked on as "luminous" 46 times; of these 30 were to the Sd. of 4° N. where the Chart shows that the Wly. current prevailed. It was recorded as "deep blue" 7 times, of these 3 were between 2° and 3° N. It was "green" 4 times, all between 0° and 1° N. where the sea was at a comparatively low temperature.

Latitude.	Sub-square.	Remarks on Sea. NOTE. A bar, thus —, separates the Remarks from different Logs.
8° to 9° N.	86	11th, 1857. Scum like dust on the surface of the water; passed through about two miles of it; saw other patches afterwards, but smaller.
6° - 7° N.	60	Very suddenly encountered a very high and short Sly. sea, causing the ship to plunge violently; it only lasted about 40 minutes.
	65	Temperature at surface, 85°; at 10 feet below 80°. (This was during a calm.)
5° - 6° N.	50	Flashes of phosphorescent light spreading 2 to 3 fathoms.
3° - 4° N.	31	Large luminous substances, apparently from 4 to 10 feet under the surface, emitting flashes of light.
	34	Sea occasionally luminous in patches.
	37	Water highly luminous, every curl of the tiny waves is liquid flame, and the wake is altogether on fire. No large phosphorescent bodies, but masses of distinct globules.
2° - 3° N.	24	Flashes of light beneath the surface at intervals.
1° - 2° N.	11	Sea remarkably luminous, the ship's wake like a line of phosphorus; also passing long lines of a fiery appearance at a distance from and quite undisturbed by the ship.
	12	Sea very luminous in stripes and patches.—Several belts of very luminous water, about 20 yards wide, lying S.E. and N.W. (Wind about E.S.E. 3.)
0° - 1° N.	00	Luminous patches (two entries).
	03	Sea slightly luminous (only on the surface).
	07	The sea is much colder and greener, whilst the air is misty. These are three signs of our being in the cold equatorial current. (Sea temperature, 76°·2; ship from the Nd.)*

* At 8 a.m., August 2nd, 1863, in Square 2 s.-s. 32, the Surface Temperature was 76°·2.
 " " 4th, " " s.-s. 07, " 69°·9.
 Noon, " 7th, " in Square 302 s.-s. 72, " 77°·8.

There were eight four-hourly observations of the temperature below 71° and averaging 70°·4; at the same time only one-tenth of the sky was clouded, the weather was very misty and the sea green. The specific gravity was about 1·0255 throughout. At this season of the year there are several cases of colder water near the Equator than to the Nd. and Sd. of it.

The Eastern and Western strips of the published Chart show that swells or seas from Sly. quarters prevail throughout the square. The S.Wly. swells increase their percentage as you pass from the Sn. to the Nn. part of the Square. A very few Nly. swells are recorded to the Nd. of 6° N. Smooth seas have a larger percentage between 4° N. and the Equator, where the Wly. current prevails, than in other parts of the square. Confused seas are most common between 8° and 10° N.

CLOUDS.

Tables 6, 7, and 8, with the remarks on Clouds, are compiled from the data for 1° sub-squares.

TABLE 6.—LATERAL STRIPS.

PERCENTAGES of each FORM, and MEAN AMOUNT of all CLOUDS.

Lateral Strips. 10° of Longitude by 1° of Latitude.	No. of Observa- tions.	Upper Clouds.			Lower Clouds.				Amount, 10 being "Com- pletely Clouded."	
		Cir.	Cir.-c.	Cir.-s.	Cum.	Cum.-s.	Str.	Nim.	No. of Obs.	Mean.
		%	%	%	%	%	%	%		
9° to 10° N. -	189	6	14	4	42	19	16	31	234	7.1
8° - 9° N. -	215	13	12	7	42	12	14	30	281	7.0
7° - 8° N. -	216	7	13	4	47	21	9	23	253	6.7
6° - 7° N. -	170	12	14	5	45	20	9	18	228	6.3
5° - 6° N. -	184	9	14	3	55	17	7	11	226	6.1
4° - 5° N. -	153	7	20	7	61	13	12	7	183	5.2
3° - 4° N. -	167	22	23	4	59	3	8	6	217	4.6
2° - 3° N. -	181	13	17	4	66	8	9	4	220	4.4
1° - 2° N. -	137	12	22	1	64	1	12	6	183	3.8
0° - 1° N. -	131	18	12	2	73	5	14	3	171	3.5

TABLE 7.—VERTICAL STRIPS.

PERCENTAGES of each FORM, and MEAN AMOUNT of all CLOUDS.

Vertical Strips. 10° of Latitude by 1° of Longitude.	No. of Observa- tions.	Upper Clouds.			Lower Clouds.				Amount, 10 being "Com- pletely Clouded."	
		Cir.	Cir.-c.	Cir.-s.	Cum.	Cum.-s.	Str.	Nim.	No. of Obs.	Mean.
		%	%	%	%	%	%	%		
20° to 21° W. -	179	12	20	5	51	10	8	16	229	5.9
21° - 22° W. -	216	11	20	6	50	10	8	13	267	5.4
22° - 23° W. -	204	10	16	7	58	12	10	8	249	5.7
23° - 24° W. -	240	16	16	5	48	17	14	16	312	5.9
24° - 25° W. -	241	13	15	3	57	11	12	15	301	5.4
25° - 26° W. -	221	10	17	2	51	15	12	17	286	5.6
26° - 27° W. -	147	5	12	4	59	14	10	16	201	5.3
27° - 28° W. -	121	20	13	3	61	10	15	12	156	6.0
28° - 29° W. -	71	6	11	1	62	10	10	32	85	5.7
29° - 30° W. -	103	7	9	4	57	17	9	19	110	5.4

The mean of the means in the 10 strips of Table 6 shows that the Mean Amount of Cloud in the whole square is 5.5 or 0.1 less than in July, but by comparing the means for each strip the greatest decrease is found between 6° and 8° N., where there has also been the greatest decrease in the percentage of Nimbus and rain, whilst a smaller decrease in the Amount of Cloud occurs between 0° and 3° N. Between 3° and 6° N. there has been a slight increase since July.

The largest amount of Nimbus as well as of cloud generally is still between 9° and 10° N., indicating that the zone of Doldrum lies to the Nd. of Square 3. There is a very rapid increase in the Amount of Cloud between 5° and 6° N., i.e., to the Nd. of the boundary line between the Ely. and Wly. currents of water. Over the cool Wly. current to the Sd. of 4° N. the Amount of Cloud only averages 4.1, whilst mist and dew are very abundant there, especially between 0° and 1° N., which is the only strip in which the sea is remarked upon as green, a common remark in mist over cold water.

By comparing Table 7 with that for July it is shown that the greatest decrease in the Amount of Cloud has taken place between 25° and 27° W., whilst the greatest increase lies between 28° and 29° W.

TABLE 8.

The following Table is derived from the Remarks on Clouds in August :—

NOTE.—All cloud entries from N. to E. b. N. inclusive have been given to the N.En. quarter.
" E. b. S. to S. " S.En. "
" S. b. W. to W. b. S. " S.Wn. "
" W. b. N. to N. b. W. " N.Wn. "

Upper clouds from E. or W. have been extracted in the Remarks. Lower clouds flying with the wind have not been recorded.

Quarters from which the Clouds and Wind came.		Lower Clouds.			Clouds (doubtful whether upper or lower).			Upper Clouds.		
Clouds from.	Wind from.	Total No. of Observations.	No. in Nn. Half of Square.	No. in Sn. Half of Square.	Total No. of Observations.	No. in Nn. Half of Square.	No. in Sn. Half of Square.	Total No. of Observations.	No. in Nn. Half of Square.	No. in Sn. Half of Square.
N.En.	S.En.	—	—	—	4	1	3	33	5	28
"	S.Wn.	—	—	—	6	5	1	19	19	—
"	N.Wn.	—	—	—	—	—	—	2	2	—
"	S.	—	—	—	1	—	1	12	7	5
"	E.	—	—	—	—	—	—	1	—	1
"	W.	—	—	—	—	—	—	3	3	—
		—	—	—	11	6	5	70	36	34
S.En.	N.En.	—	—	—	2	2	—	—	—	—
"	S.En.	—	—	—	—	—	—	13	5	8
"	S.Wn.	—	—	—	7	7	—	11	11	—
"	S.	—	—	—	—	—	—	5	2	3
"	E.	—	—	—	—	—	—	1	—	1
		—	—	—	9	9	—	30	18	12
S.Wn.	S.En.	1	—	1	5	2	3	2	2	—
"	S.Wn.	—	—	—	—	—	—	1	1	—
"	S.	—	—	—	—	—	—	1	1	—
"	W.	—	—	—	—	—	—	2	2	—
		1	—	1	5	2	3	6	6	—
N.Wn.	S.En.	—	—	—	—	—	—	5	2	3
"	S.Wn.	2	1	1	2	2	—	9	7	2
"	S.	—	—	—	1	1	—	2	2	—
		2	1	1	3	3	—	16	11	5

NOTE.—The following are the percentages of upper clouds from the various quarters, 122 being the total number of observations.

From the N.En. quarter 57% being + 22% since July.
" S.En. " 25 " " — 22 " "
" S.Wn. " 5 " " — 4 " "
" N.Wn. " 13 " " + 4 " "

The number of observations of upper clouds has very decidedly decreased in the Nn. and slightly increased in the Sn. half of the square. In the Nn. half of the square the largest number of upper clouds was from N.E., wind S.Wly. In the Sn. half of the square the largest number of upper clouds was from N.E., wind S.Ely. Upper clouds from the S.Wd. and N.Wd. were chiefly seen in the Nn. half of the square.

For the last five months, viz. from April to August, more than 80% of the upper clouds observed in Square 3 have been coming from the N.Ed. or S.Ed. In August there are only two cases of the movement of clouds when the wind was N.Ely., they were from the S.Ed. and in s.-s. 97; indicating, as already observed with regard to the wind observations, that the N.Wn. corner is more liable to N.Ely. wind than the rest of the square. There are still several cases of clouds from the S.Ed., wind S.Wly., in the Nn. half of the square, as if the friction of the Ely. current drew the lower stratum of air from a more Wly. direction than the upper.

Table 8 and its note show how very much the percentage of upper clouds from the N.Ed. has increased since July, whilst that of upper clouds from the S.Ed. has decreased by a similar amount.

The following important remarks are extracted from various logs :—

Latitude.	Sub-square.	Remarks on Clouds. NOTE. A bar, thus —, separates the remarks from different Logs.
9° to 10° N.	90	Cir.-c. at a high altitude in the S., and apparently stationary, wind S.W.
	91	Direction of lower clouds various.—Cir.-c. stationary, wind S. b. E. 3.
	93	Clouds mixed and rugged-looking, breaking slightly at times.
	94	Windy-looking clouds all round the horizon, but very clear overhead, no wind.* —Cum. from N.E. b. E., no wind.
8° — 9° N.	99	Cum. from S.W. b. S., nim. from W. b. N., no wind.
	81	Cir.-c. from N.N.W., clouds from S.W. b. W., wind S.
	82	Cir. (very lofty) slowly from N.E., wind W.S.W.
	84	Cir. from Nd., no wind.—Clouds from S.W. b. W., wind S. b. W.
	85	Nim. heavy in N.W. and N.E., wind S. b. E.
	87	Black heavy banks of clouds hanging round the horizon.
7° — 8° N.	89	31st. Rain clouds all banked in N.E. and N., but fine to the Sd.: on the 30th all appeared banked to S. and S.E. (Ship from the Nd.)
	72	Light clouds slowly from E. b. S., wind S. 4.
	73	Clouds from all directions, wind Sly.
	74	Dirty drab-coloured clouds, with small inky clouds flying rapidly over them.
	76	Cum. from N. b. E., wind S.S.W. Cir.-c. very rapidly from N.E. b. N., wind S.W. b. W. 2.
	77	Upper clouds fast from the Nd., wind S.W.—Cir. very fast from E. b. N., wind S. b. W.
	60	Heavy cir. from N. b. E., wind S.S.W.
6° — 7° N.	61	Lower clouds from the Ed., wind S.S.W. (two entries).
	63	Clouds from N.E. b. N., wind variable. Upper clouds from N.E. b. N. and W. by S., wind S. b. E.
	64	Lower clouds at times from N.W. b. W., and again from S.W. b. W., wind S.S.W.
5° — 6° N.	65	Cir. fast from N. b. E., wind S.S.E. 6.—Cum. from N.E. b. N., wind S.W. b. W.—Upper clouds from N.E. b. E. and S. b. W., wind S.
	53	Upper clouds from N.E. b. E. and S.E. b. S., wind S. b. W.
	55	Upper clouds from N.E. b. E. and S., wind S.
	56	Upper cloud stratum fast from N. b. W., wind S.W. 5.
4° — 5° N.	58	Cir.-c. from E., high cum. rising from E. and forming a bank in the N.W., wind S.
	43	Upper clouds from N.E. b. N. and S.E. b. S., wind S.—Clouds from various directions, wind S.W. b. W.
	45	Heavy banks of cum. rising in the S.E. and passing to the N.Ed., wind S.Wly.—Upper clouds from W., wind S.W. b. W.
3° — 4° N.	49	Cum. from S.E. b. E., wind S. b. E.
	30	Cir.-c. from E.N.E., and high str. from W.N.W.; no clouds with the S. b. E. wind.
	31	Much cir. extending S.W. b. W. to N.E. b. E. in long lines, wind Sly.
	32	Heavy cum. driving overhead from E.N.E., wind S. b. E.—A remarkable cir. extended from N.E. to S.W., passing through the zenith. It consisted of narrow pencilled bands, which were grouped and spread like feathers in the N.E., wind S.S.E.
	33	Cir.-c. and cir. from N.N.E. and W.N.W., wind S. b. E.—Lower clouds from S.E. b. S., no wind.—Clouds begin to come more from the Ed., wind S. b. W. (Ship from the Nd.)
	34	Cir.-c. from Nd., cum. from Sd., wind S.E. Cir. from Nd., cum. from Sd., wind S.E. (two entries).
	39	Cir.-c. from E., wind S.S.E.

* No wind, means that it was calm at the time.

Latitude.	Sub-square.	Remarks on Clouds.
		NOTE. A bar, thus —, separates the Remarks from different Logs.
2° to 3° N.	20	Cir.-c. from W., wind S.S.E.
	21	Dark, heavy bank of clouds rose from the Eastern horizon until about 20° high, then stopped, wind S.E. b. S.
	22	Cum. in dense masses in S. and W.
	23	Clouds rising in masses in S., an arch occasionally forming in E.S.E., wind S.S.E.—Cir.-s. from W., wind S.
	24	Cir.-c. fast from N.N.E., wind S.S.E.
	26	Upper clouds from N. b. E., wind variable.—Upper clouds fast from N.E., wind S.E. 3.
1° - 2° N.	12	Cir.-c. nearly stationary, high str. from W.S.W., wind S. b. E.
	14	Cir. forming a fan from N.E. b. E. to the zenith, and moving slowly over the moon from that quarter, wind S.E. b. E.
0° - 1° N.	17	Heavy nim. in the E.N.E.
	03	Sky rapidly enveloped in clouds with no apparent motion, wind S.S.E.
	05	All the clouds from N.E. b. N., wind S.S.Ely.—Cir.-c. stationary, wind S.E. 6.
	07	Cum. forming to leeward (in the N.W.) and lifting, S.Ely. wind decreasing.
	08	Arched nim. constantly rising from the S.Ed. throughout the night.

WEATHER.

TABLE 9.—LATERAL STRIPS.

Lateral Strips, being 10° of Longitude by 1° of Latitude.	Thunder. (t.) %	Lightning. (l.) %	Squalls. (q.) %	Rain. (r.) %	Mist or Haze. (m.) %	Dew. (w.) %
9° to 10° N. - - -	$\frac{1}{3}$	2	17	27	5	$\frac{1}{3}$
8° - 9° N. - - -	$\frac{3}{4}$	3	16	28	8	-
7° - 8° N. - - -	$\frac{2}{3}$	1	13	20	5	-
6° - 7° N. - - -	-	1	12	15	8	$\frac{1}{3}$
5° - 6° N. - - -	-	-	12	8	5	-
4° - 5° N. - - -	-	-	4	2	6	1
3° - 4° N. - - -	-	$\frac{1}{3}$	5	$\frac{3}{4}$	9	2
2° - 3° N. - - -	-	-	4	$\frac{3}{4}$	8	7
1° - 2° N. - - -	-	-	$\frac{1}{2}$	$\frac{1}{2}$	9	9
0° - 1° N. - - -	-	-	1	-	13	10

TABLE 10.—VERTICAL STRIPS.

Vertical Strips, being 10° of Latitude by 1° of Longitude.	Thunder. (t.) %	Lightning. (l.) %	Squalls. (q.) %	Rain. (r.) %	Mist or Haze. (m.) %	Dew. (w.) %
20° to 21° W. - - -	-	$\frac{3}{4}$	8	6	4	$\frac{3}{4}$
21° - 22° W. - - -	$\frac{1}{3}$	1	8	7	7	2
22° - 23° W. - - -	1	1	9	9	9	4
23° - 24° W. - - -	-	1	6	13	11	4
24° - 25° W. - - -	$\frac{1}{4}$	1	9	12	9	3
25° - 26° W. - - -	-	-	9	16	6	4
26° - 27° W. - - -	-	2	8	12	5	3
27° - 28° W. - - -	$\frac{1}{2}$	2	11	16	12	$\frac{1}{2}$
28° - 29° W. - - -	-	1	10	14	5	2
29° - 30° W. - - -	-	-	22	13	2	$\frac{3}{4}$

TABLE 11.—LIGHTNING.

This Table gives the bearings on which Lightning was seen in the various Lateral Strips. Only the bearings recorded as actually N., S., E., and W., have been given to those points.

Lateral Strips, being 10° of Longitude by 1° of Latitude.	Number of Observations.	Direction										All round	No direction given.
		N.	N.Ely.	E.	S.Ely.	S.	S.Wly.	W.	N.Wly.				
9° to 10° N. - - -	3	1	1	-	1	-	-	-	-	-	-	-	-
8° - 9° N. - - -	6	-	-	-	3	-	2	-	-	-	-	-	1
7° - 8° N. - - -	2	-	-	1	-	-	1	-	-	-	-	-	-
6° - 7° N. - - -	-	-	-	-	-	-	-	-	-	-	-	-	-
5° - 6° N. - - -	-	-	-	-	-	-	-	-	-	-	-	-	-
4° - 5° N. - - -	-	-	-	-	-	-	-	-	-	-	-	-	-
3° - 4° N. - - -	-	-	-	-	-	-	-	-	-	-	-	-	-
2° - 3° N. - - -	-	-	-	-	-	-	-	-	-	-	-	-	-
1° - 2° N. - - -	-	-	-	-	-	-	-	-	-	-	-	-	-
0° - 1° N. - - -	-	-	-	-	-	-	-	-	-	-	-	-	-
Total for the month and how distributed -	11	1	1	1	4	-	3	-	-	-	-	-	1

The means of the various percentages in Table 9 show a general decrease in unsettled weather since July, except in the case of squalls which continue about the same, but by comparing the percentages for each strip it is shown that lightning and rain have decreased most between 5° and 8° N., whilst squalls have decidedly increased between 8° and 10° N., but decreased slightly elsewhere so that there is no change in the mean for the square. Mist has increased most between 6° and 9° N. in the neighbourhood of the greatest decrease of rain, whilst dew has *very decidedly* increased over the cold water between 0° and 3° N. where there is very little cloud, and decreased elsewhere.

Table 10 shows that there is still a larger percentage of squalls and rain on the Wn. than on the En. side of the square, whilst mist and dew are most frequent on the En. side; these facts show that the weather continues to be more settled on its En. than on its Wn. side, although now the southerly wind seems to have nearly entire possession of the N.Wn. corner of the square.

The proportion of squalls which were heavy is greater than in July; between 5° and 10° N. about 1 in every 11 was "heavy." "Very heavy" squalls were only recorded in s.-s. 99, they were from the S.Wd. See the remark in Table 3.

Table 11 shows that the direction of very little lightning was recorded, but that it was chiefly seen in the S.En. or S.Wn. quarter, though the Doldrum was to the Nd. of Square 3. August has the fewest entries of all the months in the year.

The following remarks on Weather give the *various kinds* of lightning seen, and its direction, &c. :—

Latitude.	Sub-square.	Remarks on Weather. NOTE. A bar, thus —, separates the Remarks from different Logs.
9° to 10° N.	97	Sultry with a threatening wet sky. A halo round the moon.
	99	Large circle round the moon.—Sun-dog* in S.S.W.
8° - 9° N.	84	Very close and oppressive.
	85	Seven hours rain; heavy at times.
7° - 8° N.	71	Forked lightning in S.S.W., thunder heard in the N.E.
	77	Weather clearing up, ship from the Nd. (two entries).
6° - 7° N.	61	Lunar halo. Two rings round the moon.
	65	A hazy bur round Jupiter to the Ed.—A waterspout crossed the bows about a mile distant travelling to the E.S.E. (Wind not recorded. It had been variable, S.Wly.)
5° - 6° N.	50	0.30 p.m. 28th, 1870. A very bright halo round the sun, a perfect circle, diameter 44° 16'; orange coloured on the inside, and light palish green on the outside rim.
	53	Damp and close (two entries).
3° - 4° N.	32	11 a.m., 8th, 1870. The largest and most perfect halo I have ever seen round the sun, its radius being 22°, and at all parts a perfect circle. It was dark inside, bright outside, and slightly coloured. It disappeared at 0.30 p.m. (NOTE. This was not by the same observer as that in s.-s. 50. It will be seen that the diameters of the haloes nearly agreed.)

* Also called by seamen Wind-dog or Wind-gall. It is a prismatic colouring generally seen near the horizon.

Latitude.	Sub-square.	Remarks on Weather. NOTE. A bar, thus —, separates the Remarks from different Logs.
2° to 3° N.	23	The sky has a wild appearance, clouds swiftly from S., wind S.S.E.—Very hazy all round horizon.
	24	Sky looking very unsettled.
1° - 2° N.	12	26th. Atmosphere much clearer than of late (ship going to the Nd.).
	14	Misty on horizon.
	18	4th. Sky suddenly became overcast (ship going to the Sd.).
0° - 1° N.	00	8 a.m. Misty damp atmosphere.
	02	At sunset sky very red with long streaky clouds, "mares' tails."

GENERAL REMARKS.

The following extracts have been made from the "Remarks" in various Logs:

NATURAL HISTORY.

Latitude.	Sub-square.	Remarks on Natural History.
		<i>Land Birds and Insects.</i>
		None have been remarked upon during the month of August.
		<i>Cetacea.</i>
3° to 4° N.	32	Two <i>Whales</i> spouting at a great distance.
0° - 1° N.	08	A small <i>Whale</i> going S.W.
1° - 2° N.	11	A shoal of <i>Grampuses</i> going S.
	15	Great numbers of <i>Porpoises</i> and <i>Blackfish</i> .
0° - 10° N.	—	<i>Porpoises</i> were seen in sub-squares 94, 71, 53, 33, 21, 15* (twice), 01, 06. In s.-s. 94 they were going S.W., in 53 West, in 33 and 01 W.N.W., and in 15 South. NOTE. In July most of the <i>Cetacea</i> were in the Nn. part of the square; now they are very decidedly in the Sn.
		<i>Fish, &c.</i>
0° - 10° N.	- -	<i>Albicores</i> were seen in s.-ss. 93, 94, 25, 01. They were very large in s.-s. 25.
0° - 10° N.	- -	<i>Bonitos</i> " " 93, 94, 64, 32, 10, 01, 02.
9° - 10° N.	- -	<i>Dolphins</i> or <i>Coryphæna</i> " 93, 94.
0° - 9° N.	- -	<i>Flying Fish</i> were seen in twenty-seven sub-squares. Very abundant in 42, 45, 36, 25, 14, 01, and 05. They were small in 71, 63, 30, 32, 11, 18, and 09. Large in 07. In 32 "Sea covered with very small flying fish." In 05 "Several flying fish fell on deck." NOTE. Of the 27 sub-squares only five were in the Nn. half of the square; hence like the <i>Cetacea</i> they seem to have travelled to the Sd. since July.
1° - 2° N.	- -	<i>Shipjacks</i> were seen in s.-s. 18.
6° - 10° N.	- -	<i>Sharks</i> " s.-ss. 93, 65.

* One dot under a sub-square indicates that the creatures were abundant; two dots that they were very abundant, &c.

Latitude.	Sub-square.	Remarks on Natural History.
0° to 9° N.	- -	<i>Fish</i> (no names given) were seen in s.-ss. 88, 32, 23*, 12, 15, 09, 03, 06 (twice). In 03 " Four strange looking red fish, about 2½ feet long and 1 foot broad, having their " fins on their heads, were swimming about the ship for some time during the " afternoon of the 17th, 1855." NOTE. Here again fish were nearly all in the Sn. part of the square. <i>Portuguese-men-of-war</i> were seen in s.-ss. 78, 65, 57, 14. Only one in 78 ; in 57 two very large and beautiful, 18 ins. long and 12 ins. high ; in s.-s. 14, large.
		Remarks.
8° - 9° N.	82	Immense quantities of <i>Polypi</i> floating on the surface of the sea.
	85	Many <i>Pyrosoma</i> , very brilliant.
6° - 7° N.	65	Small <i>Gelatinous Creatures</i> in the water drawn from the sea, with a dark blue spot in them and about ½ inch long.
2 - 3° N.	21	Passed several fields of <i>Fire Cones</i> .
0° - 1° N.	02	The ship's wake most gorgeously illuminated by the <i>Medusa effulgens</i> ; many bright patches seen at distances from the ship. Could see to read at the stern windows from the light emitted.
		Sea Birds.
0° - 8° N.	- -	<i>Stormy Petrels</i> (<i>Mother Carey's Chickens</i>), were seen in s.-ss. 78, 50, 53, 54, 44, 30, 32, 36, 24, 25, 07. Generally only one or two were seen ; in s.-s. 30 a ship from the Nd. saw them for the first time.
"	- -	<i>Birds</i> (supposed to have been sea birds) were seen in s.-ss. 71, 78, 63, 64, 56, 42, 20, 24, 25, 10, 00. In 71 they were like gulls. In 64 black-backed gulls. In 20 sea gulls. In 25 a kind of sea hawk. In 00 diving after fish. NOTE.—The above figures show that petrels and sea birds were also more common in the Sn. than in the Nn. half of the square. H.M.S. "Challenger" visited St. Paul's Rocks (See Key Chart for their position) late in August 1873, and found a few eggs and young of the Booby (<i>Sula fusca</i>) and Noddy (<i>Sterna solida</i>), but supposed the breeding season to be really over. The birds themselves were most abundant.—(<i>Illustrated London News</i> , Nov. 1873.)

FALLING STARS.

There are 29 entries of Falling Stars, distributed over 9 years between 1855 and 1870, of these 7 were in each of the years 1857 and 1860, 4 in 1855, and 3 in 1859. The following remarks seem worthy of extraction :—

Sub-Square.	Hour.	Day.	Year.	Remarks on Falling Stars.
93	8 p.m.	2nd	1855	Stars shooting from S. to N.
19	Midt.	5th	"	Stars continuously shooting to the S.Wd.
	4 a.m.	6th	"	Several stars shooting to the S.Wd.
13	7 p.m. to midt.	11th	1857	Several small shooting stars about the constellations Aquila and Scorpio passing near Altair and Antares, their paths in different directions, only a few degrees in length and visible but a short time.

* One dot under a sub-square indicates that the creatures were abundant; two dots that they were very abundant, &c.

FALLING STARS—continued.

Sub-Square.	Hour.	Day.	Year.	Remarks on Falling Stars.
72	2 a.m.	20th	1857	A very large meteor from the zenith towards the N., quite illuminating the decks with a colour like that of a blue light.
24	Midt.	28th	"	Some stars shooting from S.S.E. to N.N.W. very low.
14	"	30th	"	Several shooting stars in E.N.E. towards the N.N.E. low.
65	"	1st	1859	Many shooting stars chiefly in a Nly. direction, others in all directions.
37	—	3rd	"	Still many shooting stars.
09	4 a.m.	10th	1860	Many shooting stars from the zenith towards the Sn. horizon.
76	2 a.m.	13th	"	A large blue meteor passed from the zenith to the S., vanishing at an altitude of 15°.
54	Midt.	13th	"	A meteor bursting into fragments traversed the sky from N. to W.N.W. parallel to and about 15° above the horizon, lasting 5 seconds.
23	10 p.m.	17th	"	Several meteors darting about in various directions; short in their courses.
05	Midt.	18th	"	Several stars shooting to the S.
06	2 a.m.	19th	"	Shooting stars falling to S.W.
41	4 a.m.	22nd	"	Many stars falling from W. to S.
96	8 p.m.	13th	1861	Stars shooting in various directions.
36	Midt.	13th	1863	Several small meteors S.E. by E. and N. by W.
13	10 p.m.	13th	1865	Several meteors travelling in various directions, averaging 5 an hour.
25	8 p.m.	14th	1870	Several meteors in the E., motion from N. to S.

TEMPERATURE OF RAIN AND AIR.

Sub-Square.	Temperature of Rain.	Temperature of Air.
83	78	73
70	74	76

Note.—The observation in s.-s. 83 is correctly copied from a good log, but it seems to be very doubtful.

VARIOUS.

65	Noon 11th. Temperature in sun's rays 112°; in shade 83°, there was no wind at the time.
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BEST ROUTES FOR CROSSING THE EQUATOR.

Appendix B. shows that in August the mean force of all winds is greater on the Wn. than on the En. side of Square 39, excepting in the zone between 12° and 14° N., where the winds of the En. half are decidedly the stronger; the chief cause of the difference being that the En. has 40% of S.Wly. wind having a mean force of 3·7, whilst the Wn. has only 22% of S.Wly., having a mean force of 3·2. The Wn. half has, however, a much larger percentage of N.Ely. winds than the En., and they are most favourable for the outward-bound ship.

TABLE 12.

The following Table may be usefully consulted with the August Table of Appendix B. : it shows the three points of each quarter of the compass from which the wind prevails in each half of Square 39, and proves that the N.Ely. and S.Ely. winds of the Wn. half are more Ely. than those of the En., though they draw more Nly. and Sly. as the Sn. part of the square is approached. The S.Wly. and N.Wly. winds draw more Wly. in the Sn. than in the Nn. part of the square.

The Direction of the three Prevailing Winds of each quarter of the compass, in each half of Square 39. They are in the order of their prevalence. A dash under a letter or figure indicates extreme prevalence.

Latitude.	N. to E. b. N., or N.Ely. Winds.		E. to S. b. E., or S.Ely. Winds.		S. to W. b. S., or S.Wly. Winds.		W. to N. b. W. or N.Wly. Winds.	
	Wn. half. 25° to 30° W.	En. half. 20° to 25° W.	Wn. half. 25° to 30° W.	En. half. 20° to 25° W.	Wn. half. 25° to 30° W.	En. half. 20° to 25° W.	Wn. half. 25° to 30° W.	En. half. 20° to 25° W.
	Points from North.	Points from North.	Points from South.	Points from South.	Points from South.	Points from South.	Points from North.	Points from North.
18° to 20° N.	4, 3, 2	2, N., 3	8, 7, 6	6, 8, 4	- - -	- - -	1, 2, -	2, 4, 1
16° - 18° N.	2, 4, 3	3, N., 1	8, 2, 6	8, 6, -	S., 1, 2	3, 2, 6	6, 2, 1	1, 2, -
14° - 16° N.	3, 2, 4	4, 1, N.	8, 7, 5	5, 1, 3	4, S., 2	5, 2, 6	1, 2, 3	1, 5, 2
12° - 14° N.	2, 3, 1	N., 3, 2	1, 8, 6	1, 2, 8	7, 3, 5	5, 3, 6	1, 2, 5	8, 7, 1
10° - 12° N.	1, 6, 2	1, N., 6	4, 8, 7	2, 1, 3	3, 7, 4	4, 3, 2	8, 1, 5	8, 6, 7

The accompanying Chart for August, and the prevailing wind arrows on the Diagram in its lower right-hand corner, show that Sly. winds prevail throughout Square 3, and that they gradually change from a S.Ely. direction near the Equator to S.Wly. between 8° and 10° N. The vertical strips on the lower part of the Chart show that the mean force of all winds is slightly stronger on its En. than on its Wn. side. A comparison of the En. and Wn. strips shows that the En. half only maintains this advantage between 10° and 4° N.; between 2° and 0° N. the Wn. side has the stronger mean force of wind.

The red sections in the current circles, and the arrows on the Diagram show that there is still an Easterly current prevailing between 4° and 10° N., and a Westerly one between 0° and 4° N., neither being so strong as in July, though Table 4 shows an Ely. current of 60 miles, and a Wly. of 65 miles in the 24 hours.

Appendix C. shows that in August there is very little difference in the mean direction of prevailing winds in the En. and Wn. parts of Square 303; this is best shown by running a pencil line down each part of the square, making it pass through the largest percentage for each degree of latitude. In the Nn. half of the square they are rather more Ely. in the Wn. than in the En. part, but there are so few observations in the Nn. half of the Wn. part that much dependence cannot be placed on them. By comparing the Sn. halves of both parts it is shown that the wind is very decidedly stronger in the En. than in the Wn. part. This is also shown by comparing the means of the mean forces for each degree of latitude.

From the above facts it seems right that the *Outward-bound* ship should pass to the Wd. of the Cape Verds, and stand to the S.Ed. with the S.Wly. and Sly. winds, not fearing the effect of the Ely. current, knowing that a Westerly one will be experienced to the Sd. of 4° N., where, the wind being S.Ely., she will have to stand to the S.Wd. The Equator should if possible be crossed well to the Ed., and it seems that the outward bounder should stand to the S.Ed. as long as she can make most southing on the starboard tack. It would be well to be to the Ed. of 20° W. before crossing the parallel of 4° N.

The iron ship "Conflict," of London, Captain R. Deas, was in 0° 39' N., 29° 34' W. at noon of the 5th of August; on the 6th in 0° 49' S., 30° 40' W.; on the 7th in 2° 3' S., 30° 45' W.; on the 8th in 5° 6' S., 31° 48' W.; on the 9th in 6° 16' S., 32° 2' W.; on the 10th in 6° 58' S., 31° 55' W.; on the 11th in 8° 38' S., 32° 37' W.; on the 12th in 11° 3' S., 34° 36' W. She had the wind about S.E. (true), force 3 to 4, until noon of the 7th; it was then about S.E. by E., force 5 to 6, until noon of the 8th, when it was again about S.E., force 6 to 7, with a heavy short and broken sea from the S.Ed., and she stood several hours to the E.N.E. On the 10th the wind was lighter from the S.E., and sea smoother. The Captain remarks, "Very much annoyed at the wind's hanging so obstinately south. I doubt whether it is the most expeditious way to cross the Line so far West; better, in my opinion, to make easting in 3° or 4° N., where at this season the winds are fresh from S. and no current." After the 10th the wind continued about S.E. 4. Her current was generally Wly., but not very strong. The "Conflict" was a fast iron ship with a clean bottom, and so managed to beat to the Sd. between the 8th and 9th against a strong S.E. wind and heavy short broken sea. A dull sailer would have probably lost ground, and unless she had experienced a favourable slant, might have had to go to the Nd. of the Equator, to make more Easting, before standing to the Sd. again. Such a case is not very uncommon.

The *Homeward-bound* ship should certainly keep to the Ed. of 33° W. if obliged to be in Square 303 at all, as the winds are decidedly stronger there than nearer Cape St. Roque. In Square 3 the Sly. winds are slightly stronger on the En. than on the Wn. side, whilst in Square 39 the winds generally are stronger and more Ely. on its Wn. side, so that it would probably be well to pass through Square 3 so as to be to the Wd. of 25° W. when passing the parallel of 10° N.

SEPTEMBER.

Barometer.—The isobars (see the Diagram in the lower right-hand corner of the Chart), show that the highest pressure still continues in the S.En. corner of the Square, and the lowest in its N.Wn. corner. The angle at which the prevailing wind arrows cut the isobars is very similar to that for August.

The highest mean pressure in the lateral strips (30.024) is still between 0° and 1° N., whilst the lowest (29.972) is still between 9° and 10° N.

Pressure has decreased generally since August, the change in the mean being about $-.016$ in.; by comparing the change in the various lateral strips it is shown to amount to $-.024$ in. between 3° and 5° N., whilst it is pretty uniform in other parts of the square, except between 0° and 1° N. where it is only $-.008$ in. The Mean Pressure for the month is 29.994.

The mean pressure of vertical strips compared with that for August seems to show that the decrease has been much the same in the En. and Wn. halves of the square.

Air Temperature.—A comparison of the lateral strips with those for August, shows an increase of 1.4 between 8° and 10° N., whilst the increase only amounts to 0.3 between 6° and 7° N.; from this it gradually increases to 1.1 between 1° and 2° N. The Mean Temperature of the square (78.7) shows an average increase of 0.9 since August. The means for vertical strips seem to show that the temperature of the air has increased rather more in the Wn. than in the En. half of the square. The Wn. half of the square is also about 1° warmer than the En. half. The isotherms in the Diagram indicate this; they also show how the S.E. wind brings cool air into the square, and how (as in previous months) the temperature of the air continues nearly uniform over the Ely. current.

Dry and Damp Bulbs.—The least mean difference of dry and damp bulbs (3.0) is still between 9° and 10° N., whilst the greatest (4.1) is between 2° and 3° N., between 0° and 1° N. it is only 3.8 ; here, as in August, there is much dew over the cold water and the Amount of Cloud is very small. The greatest decrease since August (0.7) has taken place between 4° and 7° N., in which zone there has also been the greatest increase of rain and squalls. Between 8° and 10° N. there has been a slight increase in the difference, where it will be found there has been the greatest decrease in the percentage of rain. To the Sd. of 4° N. there has been very little change since August. The Mean Difference for the whole square (3.6), is 0.1 less than that for August.

Sea Temperature.—The isotherms of sea temperature, given in the Diagram on the Chart, when compared with those of the air, show that the changes in the temperature of the air and sea still agree in a remarkable way, and that the sea continues to be

nearly 1° warmer than the air. The mean temperature of the lateral strips between 8° and 10° N. amounts to 80.7 , where it has increased 1.2 since August. The smallest increase (0.5) is between 5° and 6° N., whilst that for the air is between 6° and 7° N.; this is the zone which has the largest Amount of Cloud, and percentage of Nimbus. Between 2° and 4° N. there has been an increase of 0.9 whilst from 0° to 2° N. it only amounts to nearly 0.7 . The changes in air temperature have been very similar though slightly larger. The isotherms best show how uniform the temperature of the Ely. current continues to be. The Mean Surface Temperature for the whole square is 79.5 , showing an increase of 0.8 since August; this very nearly agrees with the change in the mean temperature of the air.

Specific Gravity.—The lateral strip having the lowest specific gravity of the sea (1.0265) is between 4° and 5° N.; it increases to 1.0268 between 7° and 10° N., and to 1.0272 between 0° and 1° N. The published Chart shows the lowest specific gravity in the Wn. strip between 8° and 10° N., where there is much the largest percentage of rain. By comparing the means in the various lateral strips with those for August it is shown that the greatest *decrease* ($.0005$) lies between 4° and 6° N. where there has been the greatest *increase* of rain. There has been an average *increase* of specific gravity amounting to $.0002$ between 6° and 10° N., and again between 0° and 3° N.; between 7° and 10° N. there has been the greatest *decrease* of rain since August. The Mean for the whole square (1.0268) shows no change since August.

WIND.

TABLE 1.—LATERAL STRIPS.

Lateral Strips. 10° of Longitude by 1° of Latitude.	No. of Observa- tions.	Mean Force of Strip.	N. to E. by N. or N.Ely.		E. to S. by E. or S.Ely.		S. to W. by S. or S.Wly.		W. to N. by W. or N.Wly.		Variables.		Calms.	Prevailing Wind.		Strongest Wind.*	
			%	Mean Force.	%	Mean Force.	%	Mean Force.	%	Mean Force.	%	Mean Force.	%	No. of Observations. Direction.	Mean Force.	No. of Observations. Direction.	Mean Force.
9° to 10° N. -	415	2.6	13	2.8	9	2.4	38	3.4	24	2.7	8	2.0	8	S.S.W. ²⁵	3.4	S. by W. ¹¹	4.2
8° - 9° N. -	348	2.8	14	2.8	8	2.6	44	3.5	20	2.6	7	2.4	7	S.S.W. ²⁷	4.3	S.S.W. ²⁷	4.3
7° - 8° N. -	355	2.9	8	2.8	10	3.0	57	3.4	12	2.6	6	2.6	7	S. by W. ³⁸	3.2	S. ²⁸	3.8
6° - 7° N. -	378	3.0	2	1.8	17	3.0	59	3.5	8	2.5	5	2.4	9	S. by W. ⁵⁵	3.6	S.W. by S. ³¹	3.8
5° - 6° N. -	331	3.2	3	2.2	25	3.6	56	3.6	4	2.5	8	1.9	4	S. ⁵¹	3.3	S. by W. ⁴³	4.4
4° - 5° N. -	272	3.8	1	2.3	38	4.1	55	3.9	1	3.4	4	2.8	1	S. ⁵²	4.3	S.E. by E. ⁴	5.0
3° - 4° N. -	221	3.9	1	2.5	57	4.2	39	3.7	—	—	3	2.6	—	S. by E. ⁴⁸	4.1	S.E. by E. ⁸	4.8
2° - 3° N. -	209	3.9	—	—	78	4.0	22	3.6	—	—	—	—	—	S.S.E. ⁵⁵	4.1	E.S.E. ⁴	4.5
1° - 2° N. -	180	4.0	—	—	90	4.1	9	3.5	—	—	1	2.0	—	S.S.E. ⁵⁵	4.0	S.E. by S. ³⁶	4.4
0° - 1° N. -	180	4.1	—	—	97	4.0	3	4.6	—	—	—	—	—	S.E. by S. ⁴⁹	4.0	S. ⁵	4.6

* In recording the Strongest Wind in a Strip, weight has been given to the number of observations; otherwise the direction and force of a single squall would frequently appear in this column.

TABLE 2.—VERTICAL STRIPS.

Vertical Strips. 10° of Latitude by 1° of Longitude.	No. of Observations.	Mean Force of Strip.	N. to E. by N. or N.Ely.		E. to S. by E. or S.Ely.		S. to W. by S. or S.Wly.		W. to N. by W. or N.Wly.		Variables.		Calms.	Prevailing Wind.		Strongest Wind.*	
			%	Mean Force.	%	Mean Force.	%	Mean Force.	%	Mean Force.	%	Mean Force.		No. of Observations. Direction.	Mean Force.	No. of Observations. Direction.	Mean Force.
20° to 21° W.	228	3.6	1	2.3	42	3.9	44	3.9	8	2.3	3	2.8	2	S. by E. ³²	3.9	S.E. ⁷	4.4
21° - 22° W.	278	3.5	2	3.4	31	3.9	50	3.8	9	2.2	4	2.4	4	S. ⁴⁹	3.9	W. by S. ⁷	4.7
22° - 23° W.	378	3.4	2	3.1	35	4.0	42	3.7	11	2.4	6	2.1	4	S.S.E. ⁴⁰	3.8	S.E. by E. ⁸	4.9
23° - 24° W.	460	3.2	4	2.1	33	3.8	46	3.5	6	3.2	5	2.2	6	S. by W. ⁴⁹	3.7	S. by E. ⁴	4.0
24° - 25° W.	567	3.1	7	2.4	32	3.8	40	3.3	9	2.7	6	2.4	6	S.S.E. ⁶²	3.8	E.S.E. ⁵	4.6
25° - 26° W.	362	3.4	8	3.1	30	3.9	45	3.5	7	2.9	6	2.2	4	S. by E. ³⁸	3.8	S.S.E. ³⁰	4.4
26° - 27° W.	228	3.3	12	2.6	26	4.1	43	3.6	11	2.4	4	2.1	4	S. ²⁰	3.7	S.E. ⁶	4.5
27° - 28° W.	175	3.3	1	2.8	42	3.6	38	3.6	11	2.6	5	2.6	3	S. by E. ²⁴	3.0	W. by S. ⁹	4.8
28° - 29° W.	135	2.8	10	2.9	33	3.3	33	3.2	11	3.8	2	1.3	11	S. by E. ¹²	3.3	N. by W. ⁵	5.1
29° - 30° W.	78	2.9	5	3.0	51	3.5	18	2.4	18	2.4	4	2.3	4	S. by E. ¹⁴	2.6	S.S.E. ⁷	4.4

By comparing the means of the percentages in the *lateral* strips (Table 1), with those for August we get the following results for the whole square:—

N.Ely. wind 4%, and increased 3% since August.	N.Wly. wind 7% and increased 3% since August.
S.Ely. „ 43,, and decreased 9,,	Variables 4,, „ 2,, „
S.Wly. „ 38,, „ 2,, „	Calms 4,, „ 3,, „

Hence Sly. winds have lost 11%, whilst Nly. winds have gained 6% since August.

On comparing the changes in the percentages of each strip in Table 1 it is found that N.Ely. winds have increased about 11% between 7° and 10° N. since August, whilst S.Ely. have decreased on an average 20% between 3° and 7° N., the decrease amounting to 30% between 4° and 5° N. In the same time S.Wly. winds increased 15% between 2° and 5° N., whilst they decreased 23% between 7° and 10° N.; the greatest increase (25%) being between 4° and 5° N., and the greatest decrease (31%) between 8° and 9° N. N.Wly. winds have increased 11% between 8° and 10° N.

These facts show how Nly. winds are beginning to show themselves again in the Nn. part of the square. The prevailing wind arrows on the Diagram show that the prevailing wind in the N.Wn. corner of the square is N. by W., and by consulting the Chart itself, it will be seen that N.Ely. and N.Wly. winds are very common between 8° and 10° N. In the 2° square which lies in the N.En. corner of Square 3, N.Wly. winds are almost as frequent as S.Wly.

The Mean of the mean forces of all winds in the 10 strips of Table 1 is 3.4, which shows a decrease of 0.6 since August; this is the greatest decrease for any month in the year. By comparing the mean forces of various strips it is shown that the greatest

* In recording the Strongest Wind in a Strip, weight has been given to the number of observations; otherwise the direction and force of a single squall would frequently appear in this column.

decrease (1.1 of Beaufort's scale) has taken place between 5° and 7° N., where there has been the greatest decrease in the mean forces of S.Ely., S.Wly., N.Wly., and variable winds. The greatest increase in the percentage of calms (7) has been between 6° and 8° N. The greatest increase of rain has been between 4° and 6° N., so that we have good signs of the Sn. progress of the Doldrum, which it will be seen, lies between 6° and 7° N. in October. It seems worthy of notice that nearly all the decrease of wind force has taken place in the Nn. half of the square, where, in August all the *increase* took place. Table 2, and the vertical strips of the Chart, show that Sly. winds are stronger and more frequent on the En. than on the Wn. side of the square, whilst the reverse is true with regard to Nly. winds.

TABLE 3.

Latitude.	s.-s.	Winds, Force 7 or upwards, but not Squalls.	Direction of Squalls and Heavy Squalls. (All Squalls Force 7 or upwards are considered to be heavy.) (All Squalls on either side of N., S., E., or W., are given to their respective quarters, so that there are fewer from the above-named points than from the quarters.)										s.s.	REMARKS. NOTE.—A bar, thus —, separates the Remarks of different Logs. The dates of Trade limits are in the order of the sub-squares in which they occurred, beginning with the most Eastern one.				
			N.	N.E.	E.	S.E.	S.	S.W.	W.	N.W.								
			Heavy.	Heavy.	Heavy.	Heavy.	Heavy.	Heavy.	Heavy.	Heavy.								
9° to 10° N.	91 94	S.S.W. 7 S. by W. 7	—	1	—	—	—	—	—	—	1	3	1	—	1	—	96 94	Sn. limit of N.E. Trade on 28th. Heavy squall from the N. which blew very hard for 2 hours.
8° - 9° N.	—	—	—	—	1	—	—	—	—	—	4	—	2	—	—	—	98 81 83	Heavy gusts from S. by W., force 7. Squalls, force 6, direction very variable. A constant succession of squalls with rain; wind hauling to S.S.W. in the height of them, remaining there a few minutes, and then veering to W.S.W. and falling light.—Wind in puffs.
7° - 8° N.	72	S.S.W. 7	—	—	—	—	—	—	—	1	—	—	—	—	—	—	85 87 71	27th, a steady N.E. wind and fine weather. 21st, Easterly wind, very steady in force (4) and direction. 25th, 6 to 10 p.m. Constant heavy squalls and showers, wind shifting six points with the rain and veering back in a few minutes; general direction S.Wly. to S. —Wind chiefly S.W. by S., but occa- sionally heavy black clouds would bring the wind from N., N.W., or N.E. with heavy rain.
6° - 7° N.	61	S. 7	—	—	—	—	—	2	—	—	3	—	—	—	—	—	72 74 77 63 64 65	Variable winds from N. to S. Sudden shift of wind from S.S.W. to W.N.W., force 6.—Squalls, force 6, direction variable. Baffling wind and calms. Squalls, force 6, direction variable.— Wind variable from S.S.E. to W.S.W. 15th, a fine brisk S.W. monsoon and dry weather. Regular Doldrums. — 28th, 1860, ex- changed signals with the French barque "Neireides," having lost her mizen mast. Note. Capt. Stephens of the "Hark- away," who made this report, had ex- perienced a heavy gale with fearful squalls on the 23rd and 24th, in about 11° 30' N. and 26° 30' W. The wind was E. ½ N. 9, and veered to S.E. by E. 5. He lost fore sail and fore top sail.

TABLE 3—continued.

Latitude.	s.-s.	Winds, Force 7 or upwards, but not Squalls.	Direction of Squalls and Heavy Squalls. (All Squalls Force 7 and upwards are considered to be heavy.) (All Squalls on either side of N., S., E., or W., are given to their respective quarters, so that there are fewer from the above-named points than from the quarters.)								s.-s.	REMARKS. NOTE.--A bar, thus —, separates the Remarks of different Logs. The dates of Trade limits are in the order of the sub-squares in which they occurred, beginning with the most Eastern one.								
			N.	N.E.	E.	S.E.	S.	S.W.	W.	N.W.										
			Heavy.	Heavy.	Heavy.	Heavy.	Heavy.	Heavy.	Heavy.	Heavy.										
5° to 6° N.	50	S. b. W. 7 3 entries.	-	-	-	-	-	-	-	-	1	1	-	-	-	66	24th. A vessel about 2 miles to the E. of us with a nice S. by E. breeze, ours N.W. by N., 2.			
	51	S. b. W. 7 2 entries.														68	Squall, force 6, from S. veering to E.			
	52	S. b. W. 7 S. S. W. 7														52-58	Nn. limit of S.E. Trade on 6th, 30th, and 25th.			
	53	S. S. E. 7														51	Cold blasts of air at times.			
4° - 5° N.	41	S. E. b. E. 7	-	-	-	-	-	-	-	-	1	-	-	-	-	44	Calms and wind variable round the compass, with constant rain from sun- rise to noon. 9 a.m., during a slight cessation of the rain, a waterspout, with its accompanying whirlwind, coming up from the eastward, when within 1½ miles of the ship it dis- persed. Wind round the compass.			
	43	S. S. E. 7														41	Nn. limit of S.E. Trade on 22nd.			
																43	Winds fresh and puffy from S.			
																	43	Wind backed from S.W. to S.E. in a squall, but while "in stays" veered to the S.Wd. again.		
3° - 4° N.	32	S. S. E. 7 S. E. b. E. 7	-	-	-	-	-	-	1	1	-	-	-	-	-	44	Wind all round the compass (2 entries). Squalls of force 6, direction variable.			
	36	S. b. E. 7														21st, regular Doldrums. 22nd, got S.E. Trade in 4° 30' N., having lost N.E. Trade in 15° 30' N.—24th. Wind shifted suddenly to N. from S.				
																33	Nn. limit of S.E. Trade on 5th and 30th.			
																32	S.S.E. wind steady in direction, but blowing in flaws.			
2° - 3° N.	27	S. b. E. 7	-	-	-	-	-	-	1	1	-	1	1	-	-	33	Squalls, force 6, direction variable.			
	28	S. b. E. 7							1	1	-	1	1	-	-	22	Nn. limit of S.E. Trade on 4th.			
1° - 2° N.	19	S. E. b. S. 7 2 entries.	-	-	-	-	-	-	-	-	-	-	-	-	-	13	Wind veered from S.E. to S.W.			
																14	Slight puffs.			
0° - 1° N.	—	-	-	-	-	-	-	-	-	-	-	-	-	-	-	02	Nn. limit of S.E. Trade on 15th.			
Sum	-	21, all from some Sly. direction.	-	1	1	-	-	1	2	2	2	1	11	5	4	-	1	-	06	8th, 1868, since losing N.E. Trade on 28th August in 14° N. and 26° W. have had no squalls, thunder or lightning, and little rain, but a strong steady breeze. Wind at time of remark S.S.E. 5.

NOTE.—It will be seen that all but one of the strong winds of force 7 in the Nn. half of the square were S.Wly., whilst all in the Sn. half were S.Ely. More than a third of the strong winds, force 7, are recorded between 5° and 6° N.
The heavy Ely. gale veering to S.E., experienced in 11° 30' N. and 26° 30' W., and remarked upon in s.-s. 65, was most probably part of a West India hurricane which passed away to the Wd. The French barque's log would be interesting: she was 20 days from Bordeaux, bound to San Francisco.

Since August the number of strong winds of force 7 has decreased 16. Nly., N.Ely., and Ely. squalls just show themselves again, but S.Wly. still prevail. Table 3 leads to the supposition that squalls have generally decreased in number, but this is not a fair test, as there are frequent entries of squalls where the direction is not given, and these do not appear in Table 3. Table 9 shows that their percentage has increased since August.

CURRENTS.

TABLE 4.—LATERAL STRIPS.

Lateral Strips. 10° of Longitude by 1° of Latitude.	No. of Observa- tions.	Mean Rate.	N. to E. by N. or N.Ely.		E. to S. by E. or S.Ely.		S. to W. by S. or S.Wly.		W. to N. by W. or N.Wly.		None.	Prevailing Current.		Strongest Current.*	
			%	Mean Rate.	%	Mean Rate.	%	Mean Rate.	%	Mean Rate.		No. of Observations.	Mean Rate.	Direction.	Rate.
9° to 10° N.	49	16	27	23	37	21	12	10	6	11	18	E.S.E. ⁷	22	E. by N.	51
8° - 9° N.	39	18	25	20	49	24	13	11	—	—	13	E.S.E. ⁶	30	E. by N.	41
7° - 8° N.	39	17	31	23	44	19	2	6	10	13	13	E.S.E. ⁶	21	E. by N.	50
6° - 7° N.	45	16	38	21	33	23	2	21	5	15	22	E. ⁷	23	E. by S.	42
5° - 6° N.	33	13	15	15	40	19	12	10	12	16	21	E. ⁴	22	E. by S.	48
4° - 5° N.	33	13	12	12	27	26†	9	13	31	11	21	E. ⁴	39†	E.	81†
3° - 4° N.	39	14	16	17	5	7	18	17	46	17	15	W. by N. ⁵	22	W.N.W.	29
2° - 3° N.	37	16	11	13	—	—	32	17	38	24	19	W.N.W. ⁵	21	W. by N.	54
1° - 2° N.	34	16	6	19	6	20	9	31	65	18	14	W. ⁸	19	W.	44
0° - 1° N.	32	16	12	14	6	23	28	19	38	21	16	W.S.W. ⁶	23	W.S.W.	38

* The Strongest Current in each Strip is here given, as it is important to the Navigator to know the extreme to which he is liable.
† The Rates to which a dagger is affixed are affected by one current of 81 miles to the Ed. in 24 hours. It was recorded in the log of the wooden ship "Aboukir," Captain Wilkie, September 2nd, 1862, in s.-s. 40, and was confirmed by afternoon sights. The wind had been strong from S. by E. for two days. "No current" was recorded on the previous and following days.

TABLE 5.—VERTICAL STRIPS.

Vertical Strips. 10° of Latitude by 1° of Longitude.	No. of Observa- tions.	Mean Rate.	N. to E. by N. or N.Ely.		E. to S. by E. or S.Ely.		S. to W. by S. or S.Wly.		W. to N. by W. or N.Wly.		None.	Prevailing Current.		Strongest Current.*		
			%	Mean Rate.	%	Mean Rate.	%	Mean Rate.	%	Mean Rate.		%	No. of Observations. Direction.	Mean Rate.	Direction.	Rate.
20° to 21° W.	34	16	21	18	18	31†	15	17	26	15	20	West. ⁴	15	East.	81†	
21° - 22° W.	37	15	19	16	22	19	24	14	22	19	13	E. by N. ⁴	14	N.W.	42	
22° - 23° W.	50	21	16	28	32	26	20	22	20	18	12	W.S.W. ⁶	22	E. by N.	51	
23° - 24° W.	58	15	19	19	33	19	8	14	21	19	19	E.S.E. ⁶	22	E. by N.	50	
24° - 25° W.	52	15	25	20	17	19	12	13	25	19	21	E. by N. ⁴	29	W. by N.	39	
25° - 26° W.	47	16	23	19	24	23	15	14	23	17	15	E.S.E. ⁴	31	W.	44	
26° - 27° W.	33	13	24	19	21	23	6	15	21	13	28	E.S.E. ³	20	E. by N.	41	
27° - 28° W.	34	14	21	18	29	15	6	23	26	17	18	E.S.E. ⁴	9	E. by S.	38	
28° - 29° W.	23	17	13	24	26	24	18	8	26	24	17	E. ³	30	W. by N.	54	
29° - 30° W.	12	15	17	12	42	18	8	19	33	11	—	E. ⁴	17	East twice.	24	

Table 4 shows that Wly. currents still prevail from the Equator to 4° N.; that the percentage of Ely. and Wly. is very nearly equal between 4° and 5° N., whilst Ely. currents prevail from 5° to 10° N. Hence the zone between 4° and 5° N. seems to be still the boundary between Ely. and Wly. currents.

By comparing the mean rates of all currents in the various strips with those for August, it is shown that they have generally decreased; most in the Sn. part of the square, where the Wly. current prevails. The rate and percentage of S.Ely. currents have slightly increased since August. The Ely. current of 81 miles in 24 hours, which is remarked on in the note to Table 4, seems to be quite exceptional if correct, though there are several cases in which it amounts to 50 miles. It must be remembered that the method used for estimating currents is only a rough approximation.

The sea isotherms, on the Diagram in the lower right-hand corner of the Chart, show how the Ely. current is at a uniform temperature between 80° and 81°, whilst the Wly. current gradually decreases from 80° to 77° Fahr.

Current rips were most frequently experienced in the Nn. part of the square; 9 of the 33 entries in September were recorded between 9° and 10° N., of which 8 were very heavy; 10 others were between 7° and 9° N. The Remarks allude to Ely. currents very frequently between 4° and 10° N., whilst to the Sd. of 4° N. they are never mentioned.

* The Strongest Current in each Strip is here given, as it is important to the Navigator to know the extreme to which he is liable.
† See note to Table 4.

The following remarks seem worthy of extraction:—

Latitude.	Sub-square.	Remarks on Currents.
		NOTE.—A bar, thus —, separates the Remarks from different Logs.
9° to 10° N.	97	Very strong rippings when the wind is light, toppling to the Ed.; wind S.W.
7° - 8° N.	72	Strong current ripples from S.W. by S.; wind variable, Nly.
1° - 2° N.	12 19	Sea noisy, but not high. Strong tide ripples from S.E. b. E.; wind S.S.E.

SEA.

The sea was remarked upon as “luminous” 33 times, of these there were rather more in the Sn. than in the Nn. half of the square. It was said to have been “deep blue” 23 times, of these six were between 9° and 10° N. It was “green” twice, once in s.-s. 47 and again in 02.

Latitude.	Sub-square.	Remarks on Sea.
		NOTE.—A bar, thus —, separates the Remarks from different Logs.
8° to 9° N.	85	4 a.m., 3rd, 1861. Passed through a strip of water as white as snow, stretching E. and W. as far as could be seen, and about 20 yards broad, the rest of the sea very dark and not at all luminous, wind S.W. b. S. 3.
5° - 6° N.	51 54	Lumps of phosphorescence in the water. Water looks very black, and in the dark shows no trace of phosphorescence.
4° - 5° N.	42 43	Great quantities of phosphorescence, having the appearance of balls and flashes. 6 a.m. A very high confused sea from S.S.E. and S.W., it was actually piled up in heaps, and broke with a quick plashy noise; at 9 a.m. we were clear of it. (Note. This seems to have been a meeting of the Ely. and Wly. currents; see the prevailing current arrows on the Diagram, which show that they meet between 4° and 5° N.)
	45	At 5 p.m. passed a large discoloured piece of water as big as a ship, and dark brown. First phosphorescent wake during the passage. (Ship from N.)
2° - 3° N.	24	Sea temperature fallen 1°·5 in four hours. (Ship from N.)
1° - 2° N.	13 17	The sea has not the same greenish hue which it had to the Sd. 8 p.m. Many very bright luminous belts about the wake. 10 p.m. All phosphorescence suddenly disappeared. (Ship from S.)
0° - 1° N.	05	Water very phosphorescent in the wake, flashes and patches in the distance.

The Eastern and Western strips of the published Chart show that swells or seas from some Southern quarter very much prevail in September, though those from some northern quarter have a larger percentage than in August, for instance, between 8° and 10° N. they have an average of 19% against only 7% in August, and they are more frequent on the Wn. than on the En. side of the square. Between 6° and 10° N. there is less swell or sea from the Sn. quarters, and more confused sea on the Wn. than on the En. side of the square. Between 4° and 6° N. there is much more smooth sea on its Wn. than on its En. side.

CLOUDS.

Tables 6, 7, and 8, with the remarks on Clouds, are compiled from the data for 1° sub-squares.

TABLE 6.—LATERAL STRIPS.

PERCENTAGES of each FORM, and MEAN AMOUNT of all CLOUDS.

Lateral Strips. 10° of Longitude by 1° of Latitude.	No. of Observa- tions.	Upper Clouds.			Lower Clouds.				Amount, 10 being "Com- pletely Clouded."	
		Cir.	Cir.-c.	Cir.-s.	Cum.	Cum.-s.	Str.	Nim.		
		%	%	%	%	%	%	%	No. of Obs.	Mean.
9° to 10° N. -	- 238	11	8	7	46	18	13	24	280	5.8
8° - 9° N. -	- 201	12	11	8	46	18	11	28	233	6.2
7° - 8° N. -	- 210	11	16	7	55	9	12	30	238	6.0
6° - 7° N. -	- 247	13	16	6	43	12	13	30	274	6.4
5° - 6° N. -	- 217	19	12	9	49	16	9	26	242	6.1
4° - 5° N. -	- 178	10	15	6	55	13	8	22	208	5.9
3° - 4° N. -	- 138	15	15	5	61	9	7	12	176	5.2
2° - 3° N. -	- 136	15	13	7	56	10	13	7	167	5.0
1° - 2° N. -	- 124	8	13	6	59	8	15	5	152	4.3
0° - 1° N. -	- 114	17	18	4	57	9	11	3	145	3.9

TABLE 7.—VERTICAL STRIPS.

PERCENTAGES of each FORM, and MEAN AMOUNT of all CLOUDS.

Vertical Strips. 10° of Latitude by 1° of Longitude.	No. of Observa- tions.	Upper Clouds.			Lower Clouds.				Amount, 10 being "Com- pletely Clouded."	
		Cir.	Cir.-c.	Cir.-s.	Cum.	Cum.-s.	Str.	Nim.		
		%	%	%	%	%	%	%	No. of Obs.	Mean.
20° to 21° W.	- 134	16	13	7	50	10	14	11	167	5.1
21° - 22° W.	- 162	16	6	6	49	17	18	20	210	5.8
22° - 23° W.	- 244	11	17	8	52	16	13	19	289	5.7
23° - 24° W.	- 288	11	19	10	47	16	9	24	341	5.8
24° - 25° W.	- 374	12	14	8	51	9	8	20	442	5.6
25° - 26° W.	- 214	13	13	6	50	13	12	26	238	5.9
26° - 27° W.	- 151	17	13	5	59	11	9	17	174	5.8
27° - 28° W.	- 110	8	5	2	60	9	10	30	122	5.2
28° - 29° W.	- 69	12	7	3	48	14	14	23	83	5.1
29° - 30° W.	- 57	21	12	4	51	14	18	19	49	4.9

The mean of the means in the 10 strips of Table 6 show that the Mean Amount of Cloud in the whole square is about 5.5, or the same as that for August. But by comparing the means for each strip a great decrease is found between 7° and 10° N. amounting to 1.3 between 9° and 10° N. and an increase between 0° and 5° N., averaging 0.6. The greatest decrease of rain is between 7° and 10° N., (see Table 9,) whilst its greatest increase is between 4° and 5° N. where there is the greatest increase in Amount of Cloud.

The mean of the percentages of Nimbus in the 10 strips (19%) compared with that for August, shows an average increase of 5%, but on comparing the percentages of various strips, we find that the increase is confined to the zone between 2° and 8° N., and that it amounts to 15% between 4° and 6° N.; between 9° and 10° N. there has been a decrease of 7%, whilst between 0° and 2° N. there has been scarcely any change. Hence although the lowest force of wind and largest percentage of calm are between 9° and 10° N. in September, the great increase in the amount of Nimbus and of rain (see Table 9) lies between 4° and 6° N. indicating that the Doldrum is about to be formed further South.

The largest percentage of Nimbus (30%) lies between 6° and 8° N., whilst the largest Amount of Cloud (6.4) is between 6° and 7° N.; in August they were between 9° and 10° N.

A comparison of Table 7 with that for August shows that the greatest increase in Amount of Cloud lies between 24° and 27° W., whilst the greatest decrease is between 27° and 30° W.

TABLE 8.

The following Table is derived from the Remarks on Clouds in September:—

NOTE.—All cloud entries from N. to E. b. N. inclusive have been given to the N.En. quarter.
" " E. b. S. to S. " S. En. "
" " S. b. W. to W. b. S. " S. Wn. "
" " W. b. N. to N. b. W. " N. Wn. "
Upper clouds from E. or W. have been extracted in the Remarks. Lower clouds flying with the wind have not been recorded.

Quarters from which the Clouds and Wind came.		Lower Clouds.			Clouds (doubtful whether upper or lower).			Upper Clouds.		
Clouds from.	Wind from.	Total No. of Observations.	No. in Nn. Half of Square.	No. in Sn. Half of Square.	Total No. of Observations.	No. in Nn. Half of Square.	No. in Sn. Half of Square.	Total No. of Observations.	No. in Nn. Half of Square.	No. in Sn. Half of Square.
N.En.	N.En.	—	—	—	—	—	—	3	3	—
"	S.En.	1	—	1	5	1	4	21	4	17
"	S.Wn.	—	—	—	2	1	1	14	9	5
"	N.Wn.	1	1	—	1	1	—	4	4	—
"	N.	—	—	—	—	—	—	1	—	1
"	S.	—	—	—	1	—	1	6	1	5
"	W.	—	—	—	—	—	—	1	1	—
		2	1	1	9	3	6	50	22	28
S.En.	N.En.	—	—	—	1	1	—	—	—	—
"	S.En.	—	—	—	—	—	—	11	2	—
"	S.Wn.	—	—	—	6	4	2	19	17	2
"	N.Wn.	—	—	—	1	1	—	—	—	—
"	S.	—	—	—	3	1	2	4	3	1
		—	—	—	11	7	4	34	22	12
S.Wn.	S.En.	—	—	—	4	1	3	4	3	1
"	S.Wn.	—	—	—	—	—	—	14	12	2
"	N.Wn.	—	—	—	1	1	—	—	—	—
"	N.	—	—	—	1	1	—	1	1	—
"	S.	—	—	—	—	—	—	2	—	2
"	W.	—	—	—	—	—	—	2	2	—
		—	—	—	6	3	3	23	18	5
N.Wn.	N.En.	—	—	—	1	1	—	—	—	—
"	S.En.	—	—	—	—	—	—	8	1	—
"	S.Wn.	1	1	—	3	2	1	6	6	7
"	N.Wn.	—	—	—	—	—	—	2	2	—
"	S.	—	—	—	1	—	1	3	1	2
"	W.	—	—	—	4	4	—	1	1	—
		1	1	—	9	7	2	20	11	9

NOTE.—The following are the percentages of upper clouds from the various quarters, 127 being the total number of observations.

From the N.En. quarter 39%, being — 18% since August.
" S.En. " 27 " " + 2 " "
" S.Wn. " 18 " " + 13 " "
" N.Wn. " 16 " " + 3 " "

The disposal of the observations of upper clouds between the Nn. and Sn. halves of the square is much the same as in August. In the Northern half of the square the largest number of upper clouds from any one quarter, with any one wind, is 17 from S.E., wind S.W. Whilst in the Sn. half of the square, the largest number is 17 from N.E., wind S.E. The above percentages show that upper clouds from N.E. have become less frequent, whilst those from S.W. have increased in nearly the same proportion. Table 8, compared with that for August, shows that the decrease in upper clouds from N.E. has been chiefly in the Nn. half of the square, where there has also been the greatest increase in the number of upper clouds from S.W.

The following remarks on Clouds have been extracted from the logs:—

Latitude.	Sub-square.	Remarks on Clouds.
		NOTE.—A bar, thus —, separates the Remarks from different Logs.
9° to 10° N.	92	Cir.-c. from N.N.W., wind W. by S. to N.N.W.
	93	Clouds from S., no wind.*—Cir.-c. from E.N.E., wind E. by S. to N.E.—Low cir.-s. rapidly over moon from S.S.W., small cum. slowly from N.N.E., no wind.
	94	Clouds from E. by N., no wind.—Cum. from N.E., wind N.W.—Clouds from E.S.E., no wind.—Clouds from S. by E., no wind. Clouds going to the Nd., thunder going to the Sd.; wind light and variable, from N.N.W. and S.S.E.—Cum. in vast towering masses floating sluggishly in the air with heavy rain.—Light cir.-s., very low, almost scud, rapidly over moon from S. by E., wind S.E. by S. 2.
	95	Upper from S.W., lower from S.E., wind S.S.W.—Clouds from S.E., wind N.E.
8° - 9° N.	96	Clouds from various directions, wind N.—Clouds more from the Ed. than the wind, wind N.N.E.
	97	A black cloud driving up from S.W., having previously passed over from N.E., and bringing a fresh breeze.—Cir. from E., cir.-s. from N. over the moon, wind S.
	80	Three strata of clouds, cir.-s. from E.S.E., cum.-s. slowly from S.S.W., nim. fast from S.S.W.; wind S.S.W. 6.
	82	Cir.-s. from S.S.E., lower clouds from N.N.W., wind very variable.—Cir. and cir.-c. from N., wind S. to S.W. (3 entries).
7° - 8° N.	83	Upper clouds from N., lower from S.W., no wind.
	84	Upper from N.E. by N., lower from W. by N., wind variable.
	89	Very dense and black clouds passing very slowly from N., wind variable Wly.
	72	Upper clouds from S.S.W., lower from E.N.E., wind S.S.E.—Upper from S.S.W., lower from S.E., wind S. by W.—Upper from W.S.W., wind variable.—Clouds from N., wind W.N.W.
6° - 7° N.	73	Upper clouds from S.W., lower from N., wind S.
	74	Upper from N.E. by N., lower from W. by N., wind S.
	75	Clouds from S. by E., no wind.—Leaden lurid clouds apparently stationary over the moon.
	77	Upper quickly from W.N.W., wind W.S.W. 3.
5° - 6° N.	78	Upper from N.E. by N., no wind.
	79	Light lofty cir., stationary; wind S.S.W. 1 to 2.
	60	Clouds working in all directions, wind N.W.
	61	Cir.-s. from S., no wind.
4° - 5° N.	62	Clouds from S.S.E., no wind.
	63	Clouds from W.N.W., no wind.
	64	Cum. passing from S.S.E., wind W.S.W.
	65	Cir.-c. from S.S.W., lower clouds from W.N.W., wind S.S.E.
3° - 4° N.	66	Cum. from W.N.W., wind S.S.W.
	50	Cir.-c. from E., wind S. by W.
	52	Cir.-s. from N.N.E., cir.-c. from N.W., wind S.S.W. (The cir.-s. uppermost.)
	54	Clouds passing moon from many directions, mostly from N.N.E., wind S.S.E.
2° - 3° N.	55	Clouds from S. by E., no wind.—Cir.-s. from N.W. by N., lower clouds from S.E. by S., wind S.
	56	Cir.-c. from S.W. by S., wind variable.
	57	Cir.-c. from S.S.W., lower clouds from W.S.W., wind S. by E.
	41	Cum.-s. moving against the S.S.E. wind, and settling to the E.S.E., leaving clear sky in zenith.
1° - 2° N.	42	Cir.-c. and large heavy cum. from N.E., wind S.—Cir.-s. from N.N.E., cir.-c. from N.W., wind S.W. by S. (cir.-s. uppermost.)
	43	Clouds from E., wind S.
	44	Do. do.
	45	Upper clouds from N.N.E., lower all rising from W.N.W., wind S.S.W.

* No wind, means that it was calm at the time.

Latitude.	Sub-square.	Remarks on Clouds. NOTE.—A bar, thus —, separates the Remarks from different Logs.
3° to 4° N.	31	Cir.-s. fast from W.S.W., wind S. 4 (two entries).
	32	Upper from W., wind S. by W.
	34	Various strata of clouds coming from the N.Wd. and N.Ed., wind S.
2° - 3° N.	20	Cir.-c. and cir.-s. slowly from N., wind S. by E. 4.
	21	Cir.-s. from W.S.W. fast, wind S. by E. 4.
	24	Cir.-s. from E.N.E., wind variable.
1° - 2° N.	12	Upper strata from N.E. by N., and at no great elevation, wind S.S.E.
0° - 1° N.	04	High cum. from N.E. by N., wind S.S.E.
	09	Scud flying fast from E. by N. and N.E. by E., wind S.E. by S. 4.

WEATHER.

TABLE 9.—LATERAL STRIPS.

Lateral Strips, being 10° of Longitude by 1° of Latitude.				Thunder. (t.) %	Lightning. (l.) %	Squalls. (q.) %	Rain. (r.) %	Mist or Haze. (m.) %	Dew. (w.) %
9° to 10° N.	-	-	-	2	6	15	22	5	$\frac{1}{2}$
8° - 9° N.	-	-	-	2	7	12	20	5	1
7° - 8° N.	-	-	-	$\frac{3}{4}$	3	13	18	8	-
6° - 7° N.	-	-	-	2	5	13	17	5	$\frac{3}{4}$
5° - 6° N.	-	-	-	2	3	13	18	6	1
4° - 5° N.	-	-	-	$\frac{3}{4}$	2	14	15	7	1
3° - 4° N.	-	-	-	-	-	10	8	8	2
2° - 3° N.	-	-	-	-	-	6	2	9	1
1° - 2° N.	-	-	-	-	-	2	-	8	3
0° - 1° N.	-	-	-	-	-	2	$\frac{1}{2}$	5	6

TABLE 10.—VERTICAL STRIPS.

Vertical Strips, being 10° of Latitude by 1° of Longitude.				Thunder. (t.) %	Lightning. (l.) %	Squalls. (q.) %	Rain. (r.) %	Mist or Haze. (m.) %	Dew. (w.) %
20° to 21° W.	-	-	-	-	$\frac{1}{2}$	11	7	5	4
21° - 22° W.	-	-	-	1	4	13	9	5	1
22° - 23° W.	-	-	-	$\frac{1}{2}$	2	11	14	6	1
23° - 24° W.	-	-	-	2	3	13	18	3	$\frac{1}{2}$
24° - 25° W.	-	-	-	2	5	11	14	5	1
25° - 26° W.	-	-	-	1	4	11	22	7	1
26° - 27° W.	-	-	-	1	5	12	12	10	$\frac{1}{2}$
27° - 28° W.	-	-	-	-	$\frac{1}{2}$	9	14	5	4
28° - 29° W.	-	-	-	$\frac{3}{4}$	4	4	16	16	1
29° - 30° W.	-	-	-	-	3	3	15	19	1

TABLE 11.—LIGHTNING.

This Table gives the bearings on which Lightning was seen in the various Lateral Strips. Only the bearings recorded as actually N., S., E., or W. have been given to those points.

Lateral Strips, being 10° of Longitude by 1° of Latitude.				Number of Observations.	N.	N.Ely.	E.	S.Ely.	S.	S.Wly.	W.	N.Wly.	All round	No direction given.
9° to 10° N.	-	-	-	15	3	-	1	1	2	3	1	1	-	3
8° - 9° N.	-	-	-	11	1	2	-	3	-	1	1	1	2	-
7° - 8° N.	-	-	-	9	-	-	-	3	1	3	1	-	-	1
6° - 7° N.	-	-	-	5	-	1	1	-	-	1	-	2	-	-
5° - 6° N.	-	-	-	6	-	-	-	-	-	-	2	2	-	2
4° - 5° N.	-	-	-	5	-	1	1	-	-	1	-	-	-	2
3° - 4° N.	-	-	-	-	-	-	-	-	-	-	-	-	-	-
2° - 3° N.	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1° - 2° N.	-	-	-	-	-	-	-	-	-	-	-	-	-	-
0° - 1° N.	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Total for the month and how distributed -				51	4	4	3	7	3	9	5	6	2	8

The means of the various percentages in Table 9, compared with those for August, show a general increase in unsettled weather. By comparing the means of individual strips it is shown that the increase of thunder and lightning has been almost entirely in the Nn. half of the square, squalls have increased between 0° and 7° N., but chiefly between 4° and 5° N.; rain has increased between 2° and 7° N., but chiefly also between 4° and 5° N.; mist has decreased extremely between 0° and 1° N., and dew between 0° and 3° N., though the largest amounts of both still prevail in the Sn. part of the square; where it will be remembered the temperature of both air and water as also the Amount of Cloud have increased since August. Squalls and rain have decidedly decreased between 8° and 10° N. There were not many heavy squalls recorded, but between 7° and 9° N. 1 in every 7 was heavy. Very heavy squalls were recorded in s.-ss. 82, 51, and 52, but no special remarks were given with them: those in 51 and 52 seem to have been S.Wly. It has already been shown that Nimbus and cloud generally are most abundant between 6° and 7° N. in this month. The above facts seem to indicate the Sn. progress of the Doldrum, although in September there is still the largest amount of rain and least amount of wind between 9° and 10° N.

Table 10, compared with that for August, shows that squalls have very decidedly increased in the En. and decreased in the Wn. half of the square, whilst mist has decreased in its En. and increased in its Wn. half. Rain has also increased more in the En. than in the Wn. half; these facts seem to show that the weather is becoming more unsettled on the En. than on the Wn. side of the square.

Table 11, compared with that for August, shows an increase in the number of times the bearing of lightning was recorded. It is remarkable for having a larger number of observations on some Wly. than on some Ely. bearing, the reverse having been very much the case in previous months.

The following remarks on Weather have been extracted from the logs: they give the direction in which *certain kinds* of lightning were seen, &c. :—

Latitude.	Sub-square.	Remarks on Weather. NOTE. A bar, thus —, separates the Remarks from different Logs.
9° to 10° N.	94	Large halo round the moon.—Flash l. to the S., S.W., and W.—Strong forked l. and r. in S.E.—Several flashes of sheet l.
	96	Several flashes of "meteoric" l. in various directions.
	98	A sudden transition from heat to cold; 9 a.m., air 82° in a calm; noon, 77°·5. This change appears to have been produced by the springing up of the S. wind, and from some very large rain clouds which passed close to the ship. Rain did not fall, and the clouds partially disappeared at sunset.
8° - 9° N.	81	Much sheet lightning in the W.
	83	A large halo round the sun.
	84	A great deal of lightning round the horizon.
7° - 8° N.	71	Continual sheet l. in the S.S.E. and S.S.W., wind N. 4.
	72	A very beautiful lunar rainbow.
	75	Sheet l. in the S.W.—Large halo round the moon.
	76	Pale, weak lightning to the Wd.—Sheet l. to the S.E. and S.W.—Very fine, but scorching hot.
	78	Very hot and sultry (two entries).
6° - 7° N.	79	Sun scorching.
	61	Reverberations of thunder very loud and long-continued, dying away in the distance, showing that there were vast masses of cum. floating in the air. Thunderstorm continuing all the morning.
	63	Sky covered with heavy leaden clouds, and not a breath of wind.
5° - 6° N.	64	Much t. and l. to the Ed., about 8 or 10 miles distant.
	50	Very gloomy appearance all round, wind S. b. W. 6.
	53	Much sheet l. on the Wn. horizon, with almost constant d.
	54	Much sheet l.—Splendid fine weather and clear.—Close and sultry.
4° - 5° N.	59	Very hot and sultry.
	43	Continuous heavy rain with t. and l. to S.W. and N.E.
	44	A heavy nim. all round the Western horizon, passing away to the Nd., wind S.S.W.—Lightning all round, very blue.
2° - 3° N.	49	Hot and sultry.
	23	Very black towards the W.N.W. and S.
	28	Faint zodiacal light.

GENERAL REMARKS.

The following extracts have been made from the "Remarks" in various logs:—

NATURAL HISTORY.

Latitude.	Sub-square.	Remarks on Natural History.
<i>Land Birds and Insects.</i>		
9° to 10° N.	94	A <i>Butterfly</i> flew on board.—Land birds (<i>Swallows</i>) settling about the ship.
	95	A small <i>Land Bird</i> , also a beautiful <i>Butterfly</i> .
	96	A <i>Dragon fly</i> about the ship for several hours, apparently quite fresh. Several <i>Dragon flies</i> at sunset.
7° - 8° N.	97	A small <i>Land Bird</i> , apparently very weary, lighted on the ship; it was about the size of a lark, black, with a pink breast, having a tail like a swallow.
	74	A <i>Martin</i> .
	75	Caught a <i>Hawk</i> .
4° - 5° N.	76	A <i>Swallow</i> .
	44	A <i>Bird</i> having a long bill like a snipe and feathered like a plover. NOTE.—The increased amount of Nly. wind in the Nn. part of the square has brought land birds and insects again. It will be remembered that there were none seen in July or August.
<i>Cetacea.</i>		
5° - 6° N.	54	One <i>Whale</i> .
0° - 10° N.	-	<i>Porpoises</i> were seen in s.-ss. 94, 95,* 97, 87, 70, 22, 07. In 87 they were large, and going to the Wd.; in 22 they were very large. Note.—The numbers show that they were chiefly between 7° and 10° N. In August the <i>Cetacea</i> were chiefly in the Sn. part of the square.
<i>Fish, &c.</i>		
4° - 8° N.	-	<i>Albicore</i> s were seen in s.-ss. 75 and 40. In 40 they were called tunny.
3° - 10° N.	-	<i>Bonitos</i> " " 95 and 32.
1° - 2° N.	-	<i>Dolphins</i> or <i>Coryphæna</i> " 13. Could catch them as fast as we put the hooks over, both forward and aft.
0° - 10° N.	-	<i>Flying Fish</i> " " 97, 82, 77, 67, 56, 40, 44 (twice), 21, 27, 29, 11, 00, 05.
3° - 9° N.	-	<i>Sharks</i> " " 84, 63 (twice), 54, 48, 32. In 63 several very fine sharks, five or six pilot fish with each.—Four or five good-sized sharks. In 48 caught one 2½ feet long.
3° - 9° N.	-	<i>Shippjacks</i> were seen in s.-ss. 87 and 32.
1° - 6° N.	-	<i>Fish</i> (no names given) were seen in s.-ss. 54, 15.

* One dot under a sub-square indicates that the creatures were abundant; two dots very abundant, &c.

Latitude.	Sub-square.	Remarks on Natural History.
3° to 6° N.	- -	<i>Portuguese-men-of-war</i> were seen in s.-ss. 56, 44, 45, 33. In 45 "sailed through a "batch of Portuguese-men-of-war; they were in a rippling which extended in a "line E. and W. No more than these 20 or 30 were seen before or after; they were "unusually large, bright coloured, pink, and blue. This was just after we had sailed "from S. and S.W. wind into different weather, and just after a heavy shower of "rain" (ship going N.). In 33 "some Portuguese-men-of-war, large and blue, "with pink-edged sails. I have never found them in the Ely. current hereabouts, "only in the Wly."
6° - 7° N.	68	<i>Remarks.</i> Water appears to be full of <i>Animalculæ</i> of all sorts.
4° - 5° N.	48	Saw four or five <i>Remoræ</i> , 4 ins. long. <i>Note.</i> —As a shark was caught a few hours previous to seeing them, they had probably become detached from it.
1° - 10° N.	- -	<i>Sea Birds.</i> <i>Stormy Petrels</i> (Mother Carey's Chickens) were seen in s.-ss., 95, 97, 73, 74, 63, 48, 28, 15. They were most abundant in the Nn. part of the square. In 73 eight petrels, seen for the first time (ship from the Nd.).
3° - 10° N.	- -	<i>Boobies</i> were seen in s.-ss. 93 and 34. In 34 they were going to the S.Ed. <i>Birds</i> (supposed to have been sea birds) in s.-ss. 94, 95, 82, 88, 75 (twice), 63, 64, 65, 67, 54, 56, 57, 40, 41, 43, 30, 31, 22, 11, 04, 05, 09. In 94 they were small; in 75 small, slate-coloured; in 63 gulls; in 41, 43, 30, and 31, in flocks.

FALLING STARS.

There are 14 entries of Falling Stars, distributed over 11 years between 1855 and 1870; of these, three were in 1860, and two in 1858, in the other cases there was only one a year. The following remarks seem worthy of extraction :—

Sub-square.	Hour.	Day.	Year.	Remarks on Falling Stars.
41	4 a.m.	23rd	1857	Several shooting stars from S.S.W. to eastward.
65	1.30 a.m.	7th	1858	A meteor from the zenith shot to N., and made a curious zig-zag curve of about 10°; it emitted much light.
11	8 p.m.	14th	"	Stars shooting to N.W.
01	3 a.m.	6th	1860	Shooting stars in Canis Major.
34	10 p.m.	7th	"	A few shooting stars going to N.W.
87	4 a.m.	12th	"	Stars shooting to the Wd.; in Orion.
85	8 p.m.	2nd	1861	Two beautiful meteors in the W. falling towards the N.
14	8 p.m.	4th	1862	Stars shooting from E. to W.
26	8 p.m.	30th	1864	Stars shooting to N.W. and N.E.
38	2 a.m.	16th	1867	Several meteors.

TEMPERATURE OF RAIN AND AIR.

	Sub-square.	Temperature of Rain.	Temperature of Air.
	93	77° 0	79° 0
	84	73° 0	76° 9
	74	75° 0	77° 0
	75	76° 0	79° 0
	61	74° 0	78° 8
	65	74° 0	76° 0
	55	73° 7	75° 5
	43	73° 5	77° 0
	Sum	8) 36° 2	8) 59° 2
	Mean	74° 5	77° 4 Difference 2° 9.

Sub-Square.	VARIOUS.
61	Amount of rain by gauge 4 inches in 24 hours.
28	Faint zodiacal light.
11	9 a.m. Temperature at the masthead 77°; on deck 76°.

BEST ROUTES FOR CROSSING THE EQUATOR.

Appendix B. shows that in September the mean force of all winds is very decidedly stronger in the Western than in the Eastern half of Square 39. Also that the Western half has the larger percentage of N.Ely. and S.Ely. winds. On the En. side, between 16° and 18° N. there is a large percentage (28%) of S.Ely. winds, which are pretty evenly spread throughout the quarter between E. and S. by E. The same zone has a large percentage (11%) of light variable winds. There is also 10% of calms on the En. side of the square, between 12° and 14° N.

To enable the Navigator to decide whether the wind will be more or less favourable in one half of Square 39 than in the other, the following Table gives (for zones of two degrees of latitude, and for each half of the square), the three points of each quarter of the compass which have the most wind observations.

TABLE 12.

The Direction of the three Prevailing Winds of each quarter of the compass, in each half of Square 39. They are in the order of their prevalence. A dash under a letter or figure indicates extreme prevalence.

Latitude.	N. to E. b. N., or N.Ely. Winds.		E. to S. b. E., or S.Ely. Winds.		S. to W. b. S., or S.Wly. Winds.		W. to N. b. W., or N.Wly. Winds.	
	Wn. half. 25° to 30° W.	En. half. 20° to 25° W.	Wn. half. 25° to 30° W.	En. half. 20° to 25° W.	Wn. half. 25° to 30° W.	En. half. 20° to 25° W.	Wn. half. 25° to 30° W.	En. half. 20° to 25° W.
	Points from North.	Points from North.	Points from South.	Points from South.	Points from South.	Points from South.	Points from North.	Points from North.
18° to 20° N.	4, 3, 5	4, 2, 3	8, 7, 6	8, 7, 6	3, 4, 5	— — —	2, 6, 3	3, 2, 6
16° — 18° N.	4, 3, 5	4, 2, N.	8, 5, 4	4, 8, 6	3, 1, —	S., 6, —	6, 4, 5	3, 1, 5
14° — 16° N.	3, 2, 5	N., 4, 6	8, 7, 2	6, 1, 8	4, 7, S.	3, S., 2	7, 1, 8	4, 1, 8
12° — 14° N.	1, N., 3	N., 4, 3	8, 7, 5	8, 3, 2	3, 6, 7	6, 4, 7	1, 2, 4	4, 8, 3
10° — 12° N.	3, 5, 2	N., 1, 3	7, 4, 8	6, 3, 4	3, 6, 4	7, 6, 4	1, 5, 7	8, 6, 5

Table 12 shows that the three prevailing N.Ely. and S.Ely. winds of the Wn. half are more Ely. than those of the En.

The accompanying Chart for September and the prevailing wind arrows on the Diagram in its lower right-hand corner show that Sly. winds prevail throughout Square 3, except in its extreme N.Wn. corner. They are however very light on its Wn. side between 4° and 8° N. They still gradually change from being S.Ely. near the Equator to being S.Wly. between 6° and 10° N. The mean force of all winds is decidedly greater on the En. than on the Wn. side of the square.

The red sections in the current circles and the current arrows on the Diagram of sea temperature show that Ely. currents prevail between 4° and 10° N., whilst Wly. are most frequent between 0° and 4° N. The Wly. current seems to have slightly decreased in force since August.

A comparison of the En. and Wn. parts of Appendix C. shows that in September there is about a point and a quarter of difference between the mean directions of the prevailing winds in the En. and Wn. parts of Square 303, it being about S.E. $\frac{3}{4}$ E. in the En. and S.E. $\frac{1}{2}$ S. in the Wn. part of the square. This is well shown by running a pencil line down each table, making it pass through the largest percentage for each degree of latitude, and then comparing the two lines. The Nn. half of the Wn. part still suffers from a scarcity of observations. By comparing the mean forces for each degree of latitude, it is shown that between 1° and 7° S., the winds of the Wn. part are stronger than those of the En., but weaker between 7° and 9° S. So far in the year the winds have generally been stronger near the land to the Nd. of Cape St. Roque than in

the same latitude but further E.; whilst to the Sd. of Cape St. Roque the order is reversed, and the lightest winds have been near the land, *i.e.*, between 33° and 35° W.

From the above facts it seems right that the *Outward-bound* ship should pass to the Wd. of the Cape Verds, and stand to the S.Ed. with the S.Wly. winds which will be met with in the Nn. part of Square 3; this route will keep him clear of the very light Sly. winds between 4° and 8° N. in the Wn. part of Square 3; as he progresses to the Sd. the prevailing wind will become more Sly., which with Ely. current will carry him fast to the Ed., but it must be remembered that between 0° and 4° N. the prevailing current is Wly. and the wind S.Ely., so that there the ship will be carried fast to the Wd. When most southing can be made on the port tack it should be taken; but the Equator should be crossed as far to the Ed. as the above rules will allow, and if possible not to the Wd. of 27° W. Appendix C. shows that if the *outward-bounder* enters Square 303, the winds are more favourable for getting to the Sd. between 30° and 33° W. than further West.

The iron barque "Hope," Capt. Henderson, was in 0° 10' N., 30° 42' W., on the 8th September; on the 9th, in 0° 22' S., 31° 7' W., having stood 8 hours to the Ed.; on the 10th, in 1° 20' S., 31° 35' W., having stood 8 hours to Ed.; on the 11th, in 3° 27' S., 32° 25' W.; on the 12th, in 5° 12' S., 33° 11' W., having stood to the Ed. 2 hours; on the 13th, in 7° 3' S., 34° 10' W.; on the 14th, in 7° 23' S., 33° 53' W., having stood to the Ed. for 12 hours; on the 15th, in 8° 26' S., 33° 42' W., having stood to the Ed. for 8 hours; on the 16th, in 10° 16' S., 34° 17' W. Until noon of the 10th the wind was about S.E. by S., 3 to 4, it then averaged about S.E. $\frac{1}{2}$ E. until noon of the 13th, when it became about S.E. by S. and S.E., force about 4; after the 14th it improved to S.E. and S.E. by E. From the 8th to noon of the 15th she had strong Ely., and especially strong Sly. swells which retarded her progress very much; on the 15th the Sly. swell had entirely gone. The current averaged from 30 to 15 miles to the Wd. in 24 hours, the weather was generally fine. On the 9th the Captain remarks, "Beginning to think I have spoilt my passage." On the 13th, "Regrets are useless, but this is a warning; a hard "brace, heavy head sea; wind persistently Sly., and the remembrance that I might "have made as much southing on the En. as on the Wn. tack if I had continued to "the Ed. on the 4th and 5th, and should have been in 20° S. by this time." On the 4th he was in 4° 23' N., 24° 11' W. with the wind S. by W. (true), and tacked to the Wd., so that it is probable he was quite correct in his last remark.

The *Homeward-bound* ship should avoid the light Sly. winds by keeping to the Ed. of 26° W. when passing through Square 3, and as the N.Ely. wind is more Ely. and stronger on the Wn. than on the En. side of Square 39, especially in its Sn. part, he should pass from Square 3 into the *Wn. half* of Square 39.

OCTOBER.

Barometer.—The isobars (see the Diagram in the lower right-hand corner of the Chart), show that the highest pressure still continues in the S.En. corner of the square, and the lowest in its N.Wn. corner.

The highest mean pressure in the lateral strips (29·969) is still between 0° and 1° N., whilst the lowest (29·947) lies between 5° and 6° and again between 7° and 8° N.

Pressure has decreased generally since September, the change in the mean being $-.041$, the greatest decrease for any one month of the year. By comparing the changes in the various strips it is shown that they average $-.056$ between 0° and 3° N., whilst they only average $-.028$, or half the above amount, between 7° and 10° N. The difference in these changes seems to show that the sun having crossed to the Sd. of the Equator, is quickly reducing the weight of the air in the Sn. part of the square, whilst in its Nn. part the decrease of pressure is not so great, on account of the Sn. progress of the N.E. Trade.

The Mean Pressure for the month is 29·953. The mean pressures of vertical strips compared with those for September indicate a greater decrease on the En. than on the Wn. side of the square; whilst the temperature of both air and sea has *increased* about a degree more on its En. than on its Wn. side.

Air Temperature.—There has been a general increase of air temperature since September, most between 0° and 2° N., where it averages $+1^{\circ}3$; from this it decreases to $+0^{\circ}4$ between 4° and 8° N.; from 8° N. it increases again, and amounts to $1^{\circ}1$ between 9° and 10° N. This last increase seems to be due to a special change in the N.En. corner of the square. (See the isotherms.)

The Mean Temperature for the square (79°·4) shows an average increase of $0^{\circ}7$ since September. The means for vertical strips show that nearly the whole of the increase has been in the En. half of the square, which is now as warm as the Wn.* A comparison of the isotherms with those for September shows that the area of highest temperature has changed from the Wn. side of the Nn. part of the square to its N.En. corner, where there has been a great inrush (as it were) of hot dry air from Africa, with the prevailing E.N.Ely. wind which now shows between 8° and 10° N.

Dry and Damp Bulbs.—The least mean difference of dry and damp bulbs ($3^{\circ}1$) is now between 6° and 7° N. or 3° south of its position in September; whilst the greatest ($4^{\circ}0$) is between 1° and 2° N. The greatest decrease ($0^{\circ}5$) has taken place between 3° and 4° N., the greatest increase ($0^{\circ}5$) between 9° and 10° N. The greatest increase of rain has taken place between 3° and 6° N., and its only decrease since September

* The vertical strips of the Chart show that between 28° and 30° W. there has been a decrease of $0^{\circ}4$ in the Mean Temperature of the Air, and of $0^{\circ}1$ in that of the Sea.

between 9° and 10° N.; showing the near relation between the difference of dry and damp bulbs and the amount of rain.

The Mean Difference for the whole square ($3^{\circ}5$) is $0^{\circ}1$ less than that for September. The vertical strips show that the difference has increased on the En. and decreased slightly on the Wn. side of the square. The inrush of heated air into the N.En. corner of the square has increased the difference of dry and damp bulbs in that part more than a degree since September. As a rule the wind blows from colder towards hotter air, but the N.En. part of the square is an exception to this rule in both October and November. The sudden fall of pressure over the sea seems to draw heated air from the land, and with it a large number of land creatures; as shown by the remarks on Natural History.

Sea Temperature.—The isotherms of sea temperature still agree with those for the air, and it is remarkable that the hottest sea is also in the N.En. corner of the square: this is probably due to the action of the hot air from Africa on the surface water. The mean temperature of the sea is still one degree higher than that of the air, but this difference does not exist in the N.En. corner of the square, a sign that the heated air from Africa is the source of its increased heat.

The increase of sea temperature is very uniformly spread in latitude, its greatest amount being $+1^{\circ}4$ between 0° and 2° N., whilst between 2° and 10° N. it averages about $+0^{\circ}8$.

The vertical strips show that, as with the air, the chief increase of temperature has been on the En. side of the square, whilst there has been an actual decrease of $0^{\circ}3$ between 29° and 30° W. The Ely. current is still much more uniform in its temperature than the Wly. The Mean Temperature for the whole square is $80^{\circ}5$, showing an increase of $1^{\circ}0$ since September.

Specific Gravity.—The lowest specific gravity of the sea in the lateral strips (1·0261) is between 5° and 8° N.; the Eastern and vertical strips of the Chart show that it is on the En. side of the square, though there has not been the largest percentage of rain there. It increases to 1·0266 between 8° and 10° N., and to 1·0269 between 0° and 2° N. By comparing the means for various strips with those for September, the greatest decrease is also shown to have taken place between 5° and 8° N., the greatest increase of rain has been between 3° and 8° N. Between 7° and 8° N. the decrease of specific gravity amounts to ·0008; in this zone there is the most calm and the percentage of rain has increased 9, which seems to show the near relation between specific gravity, rain, and calm. The Mean for the whole square (1·0265) shows a decrease of ·0003 since September, and there has been an increase of nearly 5% in the amount of rain.

WIND.

TABLE 1.—LATERAL STRIPS.

Lateral Strips. 10° of Longitude by 1° of Latitude.	No. of Observations.	Mean Force of Strip.	N. to E. by N. or N.Ely.		E. to S. by E. or S.Ely.		S. to W. by S. or S.Wly.		W. to N. by W. or N.Wly.		Variables.		Calms.	Prevailing Wind.		Strongest Wind.*	
			%	Mean Force.	%	Mean Force.	%	Mean Force.	%	Mean Force.	%	Mean Force.		No. of Observations. Direction.	Mean Force.	No. of Observations. Direction.	Mean Force.
9° to 10° N. -	417	2.8	52	3.1	22	3.0	9	2.9	6	1.9	5	2.3	6	N.E. by N. ⁴⁵	3.2	S.W. by W. ⁹	3.9
8° - 9° N. -	437	2.7	36	3.2	34	3.0	11	2.5	6	2.4	5	2.1	8	East. ³²	3.4	E. by N. ²⁸	3.5
7° - 8° N. -	624	2.1	21	2.9	28	2.7	21	2.5	5	1.9	8	1.9	17	East. ³⁵	2.7	N.E. by N. ¹⁵	3.4
6° - 7° N. -	694	2.0	12	2.4	32	2.5	28	2.6	5	1.8	8	1.6	15	South. ⁵⁴	2.7	E.S.E. ¹⁹	3.1
5° - 6° N. -	587	2.4	9	2.2	37	3.0	35	2.7	2	1.7	6	1.8	11	South. ⁶²	2.7	S.S.E. ⁴¹	3.8
4° - 5° N. -	464	3.0	5	2.4	48	3.4	34	3.0	2	2.6	7	1.9	4	South. ⁶²	3.2	S.S.E. ⁵⁶	3.6
3° - 4° N. -	413	3.4	2	2.6	57	3.8	32	3.1	—	—	5	2.4	4	S.S.E. ⁷²	4.2	S.S.E. ⁷²	4.2
2° - 3° N. -	305	3.8	2	1.8	81	4.0	14	3.3	—	—	2	2.1	1	S.S.E. ⁷⁶	4.1	E. by S. ⁵	4.4
1° - 2° N. -	274	4.0	1	4.0	88	4.1	10	3.8	—	—	1	4.5	—	S.E. by S. ⁸³	4.1	East. ²	5.0
0° - 1° N. -	216	4.1	—	—	98	4.1	2	3.6	—	—	—	—	—	S.E. by S. ⁶⁰	4.2	S.E. by E. ¹⁹	4.4

TABLE 2.—VERTICAL STRIPS.

Vertical Strips. 10° of Latitude by 1° of Longitude.	No. of Observations.	Mean Force of Strip.	N. to E. by N. or N.Ely.		E. to S. by E. or S.Ely.		S. to W. by S. or S.Wly.		W. to N. by W. or N.Wly.		Variables.		Calms.	Prevailing Wind.		Strongest Wind.*	
			%	Mean Force.	%	Mean Force.	%	Mean Force.	%	Mean Force.	%	Mean Force.		No. of Observations. Direction.	Mean Force.	No. of Observations. Direction.	Mean Force.
20° to 21° W.	192	2.6	4	2.5	38	3.2	36	2.7	7	2.0	12	1.6	3	S.S.E. ²²	3.5	S.E. ⁴	3.8
21° - 22° W.	322	2.7	16	2.6	32	3.5	37	2.6	5	1.6	5	1.9	5	South. ⁴⁶	2.9	S.E. by S. ¹³	4.1
22° - 23° W.	416	2.6	11	2.1	50	3.4	24	2.7	1	1.8	3	2.3	11	S.S.E. ⁵¹	3.6	E.S.E. ⁸	3.8
23° - 24° W.	588	2.8	16	2.9	42	3.4	26	3.0	2	2.3	4	1.9	10	S.S.E. ⁷³	3.7	W.S.W. ⁴	4.0
24° - 25° W.	800	2.6	16	2.7	43	3.2	23	2.9	2	2.0	5	1.9	11	S.S.E. ⁷⁶	3.4	S.W. by W. ⁸	3.7
25° - 26° W.	849	2.8	18	3.2	42	3.4	21	2.7	3	2.2	8	1.8	8	S. by E. ⁷⁵	3.2	S.S.E. ⁶³	3.7
26° - 27° W.	486	3.0	18	3.3	54	3.4	14	2.7	2	1.7	6	2.3	6	S.E. by S. ⁶¹	3.7	N.E. ¹⁰	4.4
27° - 28° W.	359	3.1	17	3.0	52	3.8	15	2.9	8	1.9	3	1.8	5	S.E. by S. ⁴⁸	4.0	S.S.E. ²⁹	4.2
28° - 29° W.	240	2.9	12	2.5	48	3.6	15	3.3	3	2.4	12	2.2	10	S.E. by S. ²⁸	4.0	S.E. by E. ⁸	4.4
29° - 30° W.	179	3.4	11	3.3	66	3.8	12	3.1	2	1.5	5	2.2	4	S.E. by S. ²⁸	4.0	S.S.E. ²⁰	4.3

* In recording the Strongest Wind in a Strip, weight has been given to the number of observations; otherwise the direction and force of a single squall would frequently appear in this column.

By comparing the means of the percentages in the *lateral* strips (Table 1) with those for September, the following results are obtained for the whole square:—

N.Ely. wind	14%	and increased	10%	since September.
S.Ely. „	52 „	„	9 „	„
S.Wly. „	19 „	and decreased	19 „	„
N.Wly. „	3 „	„	4 „	„
Variables	5 „	and increased	1 „	„
Calms	7 „	„	3 „	„

Hence Ely. winds have very decidedly increased in amount, whilst Wly. have more decidedly decreased. On comparing the various lateral strips the greatest increase in the percentage of N.Ely. and S.Ely. winds is found between 6° and 10° N.; in the case of S.Ely. winds the increase is chiefly in winds from E. to E.S.E. In the same zone there is the greatest decrease in the percentage of S.Wly. and N.Wly. winds: it averages 32% in the case of S.Wly. winds. Here is shown the tendency of the air to move towards a lower pressure on the Wn. side of Square 3. This lower pressure is more decided in November and December, see the isobars for these months, which looks as if the vertical sun over the Nn. part of South America were beginning to influence the pressure and winds of Square 3, whilst the prevailing wind arrows on the Diagram in the lower right-hand corner of the Chart show how E.N.Ely. winds prevail between 8° and 10° N. as if Africa were supplying air to meet the demand; this idea is supported by the great heat and large number of Land Birds, &c. met with in the N.En. corner of Square 3.

The Mean of the mean forces of all winds in the ten strips of Table 1 is 3.0, which shows a decrease of 0.4 since September, and is the lowest monthly mean force which exists between the decrease of Sly. and increase of Nly. winds. In May, when Nly. winds are decreasing and Sly. increasing the mean force for the square is down to 2.9. By comparing the mean forces of all winds in the various strips, it is shown that the greatest decrease since September (1.0) has taken place between 6° and 7° N., it averages nearly 0.9 between 4° and 8° N. There has been an increase in the force of N.Ely. winds, though chiefly between 6° and 10° N. and of S.Ely., or rather E. to E.S.Ely. winds between 8° and 10° N.; between 3° and 8° N. S.Ely. winds have decreased about 0.5 in force. Between 4° and 9° N. S.Wly. winds have decreased 0.9, and N.Wly. nearly 0.8 in force. Calms have increased nearly 8% between 5° and 8° N. The strip having the least mean force in the whole square (2.0) lies between 6° and 7° N., and it is only 2.1 between 7° and 8° N., here also is the largest amount of rain, and the most Nimbus, so that the heart of the Doldrum may be considered to be between 6° and 8° N.

Table 2 and the Vertical Strips on the Chart show that there is much more S.Wly. wind on the En. than on the Wn. side of the Square, whilst a comparison with September shows that the force of wind has decreased most on its En. side; in fact N.Ely. winds have slightly *increased* in force on its Wn. side, whilst that of S.Ely. and S.Wly. has increased between 28° and 30° W.

TABLE 3.

Latitude.	s.-s.	Winds, Force 7 or upwards, but not Squalls.	Direction of Squalls and Heavy Squalls. (All Squalls Force 7 or upwards are considered to be heavy.) (All Squalls on either side of N., S., E., or W., are given to their respective quarters, so that there are fewer from the above-named points than from the quarters.)										s.-s.	REMARKS. NOTE. A bar, thus —, separates the Remarks of different Logs. The dates of Trade limits are in the order of the sub-squares in which they occurred, beginning with the most En. one.						
			N.	N.E.	E.	S.E.	S.	S.W.	W.	N.W.										
			Heavy.	Heavy.	Heavy.	Heavy.	Heavy.	Heavy.	Heavy.	Heavy.										
9° to 10° N.	96	N.E. 7 2 entries. S.Wly. 8 to 10	—	—	2	—	2	—	2	1	—	—	—	1	1	1	—	—	94-98	Sn. limit of N.E. Trade on 31st, 29th, 16th. 91 Squalls from E.N.E. to E.S.E., force 6. 95 A severe squall, force 8, with torrents of r., heavy t. and l. — Squalls from W. by S. and N.W. by W. 96 4 to 7 a.m., 19th, 1864. Very heavy q. with extremely heavy r., in sheets, the heaviest when we had most wind. A smart Sly. swell heaving up. 7 a.m. gale abating, but still heavy r. I never felt such a determined force of wind, lasting so long, about this latitude. It blew hardest from S. and S.W. (force 8 to 10) lasting 3½ hours. On the 20th a storm apparently passing from E. to W. to the Sd. of us. 97 Fresh S.E. wind for 4 hours. 98 Doldrum weather (2 entries).
8° - 9° N.	—	—	—	—	—	1	—	—	1	4	1	—	1	1	—	—	—	—	83-87	Sn. limit of N.E. Trade on 26th, 22nd, 23rd, 14th, 7th. 85 A very hard squall from S.E. by E. for two hours with rain; afterwards calm.
7° - 8° N.	—	—	—	—	—	4	4	—	—	2	3	1	1	—	—	—	—	—	73	Sudden shift of wind from S. to N.
																		74	The arched or black squall frequently rising from E.N.E., bringing hard puffs and heavy showers.—Wind flying round all ways in rain squalls.	
																		75	Wind not steady a minute.—Squall from S. bringing a pleasant N.Ely. breeze, force 4 to 5.—The rotation of the wind accompanying the heavy showers is with the hands of a watch, from S. to W., then N. to N.E. for a short time, and back to S. and S.W. where it remains for some time.—Squall E.N.E., 8.	
																		76	Wind varying with the squalls from E. by N. to S. by E.—Wind veering from N. by W. to E. by N. and back several times.	
																		77	20th. Never saw such variables, wind all round the compass and each puff lasts only from ½ to 1 hour.	
																		78	Much forked l. in N. and N.E. with a perfect deluge of rain, squall clouds passing which look dirty enough to blow the masts out, but have nothing in them.	

TABLE 3—continued.

Latitude.	s.-s.	Winds, Force 7 or upwards, but not Squalls.	Direction of Squalls and Heavy Squalls.										s.-s.	REMARKS. NOTE. A bar, thus —, separates the Remarks of different Logs. The dates of Trade limits are in the order of the sub-squares in which they occurred, beginning with the most En. one.						
			(All Squalls Force 7 or upwards are considered to be heavy.) (All Squalls on either side of N., S., E., or W., are given to their re- spective quarters, so that there are fewer from the above-named points than from the quarters.)																	
			N.	N.E.	E.	S.E.	S.	S.W.	W.	N.W.										
			Heavy.	Heavy.	Heavy.	Heavy.	Heavy.	Heavy.	Heavy.	Heavy.	Heavy.									
6° to 7° N.	63 65	S.W. 7 E. 7	1	—	1	4	1	—	—	1	2	—	2	1	—	1	—	1	69 64 & 68 63	Sn. limit of N.E. Trade on 26th. Nn. „ S.E. „ on 18th and 25th. Occasional variable breezes from every rain cloud.—A very violent squall from E.S.E., and shifting suddenly to S.S.W., with torrents of rain. Ships to the Ed. of us had it worst, we lost courses, and another ship her main top gallant mast.—Heavy squalls from the Wd., veering south.
																		64	9 a.m. 26th, 1855. A strange circular motion of the water close to us, like an eddy in a tide way, or the motion of water in a whirlwind; it moved very slowly to the Nd. in the teeth of a faint Nly. air; no motion perceived in the clouds, nor any sign of wind near; about ¼ of an hour later the wind flew to S.E. by S. in a heavy q. and r.—28th. A perfect calm for 16 hrs.—25th. Never had such variables before at any season.	
																		65	Heavy squalls, force about 7.—Heavy rain squall from N.E. by N. round to E. by S.—Heavy squall veering from N. by E. round to S.E. by S.	
																		66	Loud moaning noise in the sky as if blowing a gale of wind.	
																		68	26th. Wind sprung up strong from N.E. after 2 hours calm. All appearance of the N.E. Trade.	
5° - 6° N.	52	S.S.E. 6 to 7 (2 entries).	—	—	1	1	—	—	—	6	1	—	—	—	—	—	1	—	51-56	Nn. limit of S.E. Trade on 7th, 2nd, 29th, 15th, 19th, 24th, 17th.
																		53	19th. A heavy squall carried away jib boom (wind seems to have been N.E.) —A smart E. wind for an hour.—25th. Strong gusts of short duration (pro- bably southerly).	
																		54	16th. Wind went round the compass several times.	
																		55	Wind variable in squalls, force 7.	
																		56	Black squalls, some arched have very little wind in them. (Wind, S.Wly.)	
4° - 5° N.	43 44	S.S.E. 6 to 7 S.E. 6 to 7	—	—	2	—	—	—	5	2	—	1	2	—	1	—	—	—	43-46	Nn. limit of S.E. Trade on 24th, 9th, 14th, 30th, 28th, 13th.
																		44	22nd. Arched squall from N.E. by N.— 15th. N.E. wind for an hour with heavy r., it had been S.S.E., 3.	
3° - 4° N.	33 34	S.S.E. 7 (2 entries). S.E. by S. 7 (2 entries).	—	—	1	—	—	—	8	1	—	—	1	—	—	—	—	—	31-39	Nn. limit of S.E. Trade on 27th, 18th, 21st.
																		32	Brisk S.S.E. gale.	
																		34	A heavy S.S.E. squall, force 7, with bright and clear weather; carried away main top gallant mast.	

TABLE 3—continued.

Latitude.	s.-s.	Winds, Force 7 or upwards, but not Squalls.	Direction of Squalls and Heavy Squalls. (All Squalls Force 7 or upwards are considered to be heavy.) (All Squalls on either side of N., S., E., or W., are given to their respective quarters, so that there are fewer from the above-named points than from the quarters.)										s.-s.	REMARKS. NOTE. A bar, thus —, separates the Remarks of different Logs. The dates of Trade limits are in the order of the sub-squares in which they occurred, beginning with the most En. one.				
			N.	N.E.	E.	S.E.	S.	S.W.	W.	N.W.								
			Heavy.	Heavy.	Heavy.	Heavy.	Heavy.	Heavy.	Heavy.	Heavy.								
2° to 3° N.	—	—	—	—	—	1	—	—	—	—	—	—	25	Nn. limit of S.E. Trade on 15th.				
													21	23rd. Sky overcast with leaden coloured nim., giving some severe squalls, with rain.				
													24	11th. Wind flying about with heavy showers.				
													26	29th. Wind shifted from S. by W. to E. by N. in a hard squall, strong gusts of wind between S. by E. and E. by N.				
													27	18th. Sudden shift of wind from S.E. to N. by E. hauling to N. by W. and N.W. by W.				
1° - 2° N.	—	—	—	—	—	1	—	—	—	—	—	—	14 & 16	Nn. limit of S.E. Trade on 21st, 17th, 19th, 17th.				
													16	29th. Variable winds mostly from the Sd., force 7 at times.				
													17	8 p.m., 2nd, 1858. A tremendously heavy squall with extremely heavy r., duration of wind $\frac{1}{2}$ an hour, of rain 3 hrs., calm $\frac{1}{2}$ an hour. In the squall sea luminous. (Wind most probably S.S.Ely.)				
0° - 1° N.	03 05 06	S.E. 7 " 7 " 7 S. by E. 7	—	—	—	—	—	—	—	—	—	—	03	24th. Sunrise and sunset, sharp squalls, force 5 to 7 (apparently S.Ely.).				
													05	7th. Strong breeze from S.E. by S.				
													09	19th. Weather fine, but wind puffy.				
Sum.	—	17, of which 12 are to the Sd. of 6° N. and all S.Ely.	1	—	11	10	3	—	19	19	5	2	6	3	2	2	1	1

NOTE.—There are two N.Ely. and two S.Wly. strong winds in the Nn. half of the square, the S.W. wind force 8 to 10 in s.-s. 96 was probably part of a hurricane. Its date is given in the remarks, so that perhaps other traces of it may come to light. S.Wly. squalls have decreased in number since September, but N.Ely. and S.Ely. have become very frequent, and nearly half of them are heavy, indicating the conflict that is going on as the N.E. Trade displaces the Sly. wind. The high temperature of the N.En. corner of the square shows that hot Easterly winds are brought in contact with Sly. ones, which may account for the large number of squalls. It will be noticed that frequent mention is made of the wind's veering (*i.e.* changing with the hands of a watch) in the squalls.

Since September the number of strong winds of force 7 has decreased 4, but there are now 85 squalls reported in the place of 31 in September. It has already been remarked that this is not a proof that the number of squalls has really increased, because so many are recorded without any direction, and these do not appear in Table 3. Table 9, however, shows that the percentage of squalls has decidedly increased since September.

CURRENTS.

TABLE 4.—LATERAL STRIPS.

Lateral Strips. 10° of Longitude by 1° of Latitude.	No. of Observations.	Mean Rate.	N. to E. by N. or N.Ely.		E. to S. by E. or S.Ely.		S. to W. by S. or S.Wly.		W. to N. by W. or N.Wly.		None.	Prevailing Current.		Strongest Current.*	
			%	Mean Rate.	%	Mean Rate.	%	Mean Rate.	%	Mean Rate.	%	No. of Observations.	Mean Rate.	Direction.	Rate.
9° to 10° N.	56	11	11	16	34	19	7	18	14	15	34	S.E. ⁴ b. E.	23	S.E. b. E.	37
8° - 9° N.	57	12	19	11	39	20	10	12	11	10	21	E.S.E.	23	S.E. b. S.	42
7° - 8° N.	55	13	24	21	36	16	9	15	9	12	22	E.	19	E.N.E.	43
6° - 7° N.	73	15	37	18	27	18	11	14	11	16	14	S.E. ⁵ b. E.	21	N.E. b. E.	42
5° - 6° N.	54	13	24	14	22	17	17	19	20	12	17	W.N.W.	16	W.N.W.	34
4° - 5° N.	60	10	25	18	13	14	7	21	22	13	33	N.E.	13	N.E. b. N.	44
3° - 4° N.	48	12	25	14	13	15	6	12	27	21	29	N.W. ³ b. W.	23	N.W. b. W.	36
2° - 3° N.	56	15	9	17	9	14	21	19	36	22	25	W.	24	W. b. S.	65
1° - 2° N.	47	14	13	13	2	22	11	13	55	19	19	W.	24	W.	39
0° - 1° N.	50	16	8	13	10	14	26	17	44	20	12	W.	26	W.	50

TABLE 5.—VERTICAL STRIPS.

Vertical Strips. 10° of Latitude by 1° of Longitude.	No. of Observations.	Mean Rate.	N. to E. by N. or N.Ely.		E. to S. by E. or S.Ely.		S. to W. by S. or S.Wly.		W. to N. by W. or N.Wly.		None.	Prevailing Current.		Strongest Current.*	
			%	Mean Rate.	%	Mean Rate.	%	Mean Rate.	%	Mean Rate.	%	No. of Observations.	Mean Rate.	Direction.	Rate.
20° to 21° W.	26	17	31	24	19	19	27	14	15	19	8	N.E. ³ b. N.	24	N.E. b. N.	40
21° - 22° W.	41	13	24	10	27	17	12	17	20	20	17	W.	26	W.	41
22° - 23° W.	60	15	28	16	17	21	13	16	25	19	17	W.N.W.	17	W.	50
23° - 24° W.	64	13	19	18	28	18	11	16	14	18	28	E.	17	N.E. b. N.	44
24° - 25° W.	86	11	25	15	23	15	6	23	16	15	30	E.N.E.	17	E.N.E.	43
25° - 26° W.	104	13	12	17	18	15	13	16	34	17	23	W.	23	W.N.W.	45
26° - 27° W.	67	13	21	16	24	18	14	12	22	15	19	W.	15	S.E. b. E.	33
27° - 28° W.	52	11	19	16	21	17	8	10	21	18	31	W. ⁴ b. N.	23	E.S.E.	38
28° - 29° W.	32	17	9	26	12	19	19	24	44	17	16	N.W.	12	W. b. S.	65
29° - 30° W.	24	17	17	12	17	22	21	24	29	21	16	N.E.	13	S.E.	35

* The Strongest Current in each Strip is here given, as it is important to the Navigator to know the extreme to which he is liable.

Table 4 shows that Wly. currents prevail from the Equator to 3° N., and Ely. from 4° to 10° N. Hence the zone between 3° and 4° N. seems to be the boundary line between Ely. and Wly. currents. Table 4 also shows a general decrease in the mean rate of all currents since September, especially in the Nn. part of the square, where Ely. currents have decreased very much in percentage as well as in rate. By referring to the Diagram for October it will be seen that between 8° and 10° N. the prevailing current is S.Ely. as though it were diverted by the N.Ely. wind now showing in the Nn. part of the square. In November the effect is more marked, whilst in December the Ely. is replaced by a Wly. current, showing the gradual influence of wind on current.

The isotherms of sea show that the Ely current is still very uniform in temperature, being about 81° Fahr., whilst the Wly. current gradually decreases in temperature between 4° N. and the Equator.

Current rips were most frequently experienced in the Nn. part of Square 3: 14 out of the 42 entries in October, were recorded between 9° and 10° N. The Diagram shows that the prevailing wind was from E.N.E., whilst the prevailing current was to E.S.E., so that they were nearly in opposition to each other. The next zone having the most frequent entries of current rips lies between 4° and 5° N., which is near the meeting of the Ely. and Wly. currents.

The following remarks seem worthy of extraction :—

Latitude.	Sub-square.	Remarks on Currents.
		NOTE. A bar thus —, separates the Remarks from different Logs.
9° to 10° N.	92	Unusually high current ripple extending E.N.E. and W.S.W., wind probably S.E. Tide ripples from N.E. by N. (two entries). 31st. Tried the current with a boat, and found it setting S.S.W., about 1¼ knots per hour, probably merely a surface current as the ship did not seem to drift during the time the boat was anchored. Found current (by boat) setting E. by N., 1 mile per hour.
	95	
7° - 8° N.	71	
	75	

SEA.

The sea was reported as “luminous” 27 times, of these 15 were between 0° and 4° N. It was “deep blue” six times, of these four were between 1° and 5° N., it was “green” four times.

Latitude.	Sub-square.	Remarks on Sea.
		NOTE. A bar thus —, separates the Remarks from different Logs.
9° to 10° N.	97	Sea bluish slate, roily.
8° - 9° N.	87	Sea glaucous green.
6° - 7° N.	66	Water bright glaucous green.
5° - 6° N.	55	Water brilliant ultra-marine.—Sea slate green and turbid looking.
	57	Many luminous balls flashing at intervals.
3° - 4° N.	37	A great many luminous lumps flashing at intervals; no brightness in the wake.

Remarks.	Sub-square.	Remarks on Sea.
		NOTE. A bar thus —, separates the Remarks from different Logs.
2° to 3° N.	21	Patches of dark green rippled water running N.N.W. and S.S.E., like a cat's paw on very placid water. They were not caused by reflection. (Wind seems to have been S.S.E.)

The En. and Wn. strips of the published Chart show that swells or seas from some Sly. quarter very much prevail over all others in October. Between 8° and 10° N. there is an average of 20% from the various Nly. directions, and they are more frequent on the Wn. than on the En. side of the square.

From 4° to 10° N. there are fewer swells or seas from some Sly. quarter on the Wn. than on the En. side of the square, but more confused and smooth seas.

Between the Equator and 4° N. there is much more S.Ely. and less Sly. sea in the Wn. than in the En. half of the square.

There is more confused and less smooth sea in the Nn. than in the Sn. part of the square.

CLOUDS.

Tables 6, 7, and 8, with the remarks on Clouds, are compiled from the data for 1° sub-squares.

TABLE 6.—LATERAL STRIPS.
PERCENTAGES of each FORM, and MEAN AMOUNT of all CLOUDS.

Lateral Strips. 10° of Longitude by 1° of Latitude.	No. of Observations.	Upper Clouds.			Lower Clouds.				Amount, 10 being “Com- pletely Clouded.”	
		Cir.	Cir.-c.	Cir.-s.	Cum.	Cum.-s.	Str.	Nim.	No. of Obs.	Mean.
		%	%	%	%	%	%	%		
9° to 10° N.	- 269	12	15	7	45	15	8	22	313	5·1
8° - 9° N.	- 277	11	9	9	40	19	10	31	339	5·9
7° - 8° N.	- 411	8	10	7	41	15	12	34	467	6·1
6° - 7° N.	- 442	7	9	7	43	14	13	38	517	6·3
5° - 6° N.	- 399	8	8	8	45	17	11	29	448	6·5
4° - 5° N.	- 320	10	9	6	44	14	12	30	367	6·5
3° - 4° N.	- 312	18	17	6	47	13	9	24	345	6·1
2° - 3° N.	- 222	14	19	9	49	14	9	14	252	5·0
1° - 2° N.	- 203	15	16	7	53	12	9	5	225	4·4
0° - 1° N.	- 147	13	18	7	60	7	5	6	175	3·9

TABLE 7.—VERTICAL STRIPS.

[PERCENTAGES of each FORM, and MEAN AMOUNT of all CLOUDS.]

Vertical Strips. 10° of Latitude by 1° of Longitude.	No. of Observa- tions.	Upper Clouds.			Lower Clouds.				Amount, 10 being "Com- pletely Clouded."	
		Cir.	Cir.-c.	Cir.-s.	Cum.	Cum.-s.	Str.	Nim.		
		%	%	%	%	%	%	%	No. of Obs.	Mean.
20° to 21° W.	117	11	7	—	52	15	7	23	150	5.3
21° — 22° W.	226	12	17	4	39	15	7	17	257	5.7
22° — 23° W.	238	15	11	3	49	18	9	22	318	5.8
23° — 24° W.	403	9	11	8	51	14	6	21	477	5.9
24° — 25° W.	547	7	12	10	49	17	8	26	600	6.0
25° — 26° W.	575	10	14	7	44	14	14	29	659	6.1
26° — 27° W.	332	10	10	6	35	15	13	36	374	5.6
27° — 28° W.	270	18	9	12	47	7	13	30	291	5.2
28° — 29° W.	149	16	8	6	41	12	16	31	168	6.2
29° — 30° W.	145	10	10	7	45	19	14	23	154	5.6

The mean of the means in the strips of Table 6 shows that the Mean Amount of Cloud for the whole square is 5.6, or slightly more than in September; but by comparing the means for each strip, it is shown to have decreased 0.7 between 9° and 10° N., and 0.3 between 8° and 9° N., whilst it has increased 0.9 between 3° and 4° N., and there is an average increase of 0.6 between 3° and 6° N.

The mean of the percentages of Nimbus in the 10 strips (23%) shows an increase for the whole square of 4% since September, but a comparison of the percentages in each strip shows that the increase amounts to 12% between 3° and 4° N., and averages 7% between 2° and 8° N. There has been a slight decrease between 9° and 10° N.

The largest percentage of Nimbus (38) lies between 6° and 7° N., whilst the largest Amount of Cloud (6.5) lies between 4° and 6° N.; both have travelled to the Sd. since September.

The largest percentages of Nimbus and rain, together with the least mean force of all winds agree in placing the Doldrum between 6° and 8° N. in October.

A comparison of Table 7 with that for September shows that the greatest increase in the Amount of Cloud lies between 28° and 30° W. Nimbus has increased most between 26° and 27° W.

TABLE 8.

The following Table is derived from the Remarks on Clouds in October:—

NOTE.—All cloud entries from N. to E. by N. inclusive have been given to the N.En. quarter.

" E. by S. to S. " S.En. "

" S. by W. to W. by S. " S.Wn. "

" W. by N. to N. by W. " N.Wn. "

Upper clouds from E. or W. have been extracted in the Remarks. Lower clouds flying with the wind have not been recorded.

Quarters from which the Clouds and Wind came.		Lower Clouds.			Clouds (doubtful whether upper or lower).			Upper Clouds.		
Clouds from.	Wind from.	Total No. of Observa- tions.	No. in. Nn. Half of Square.	No. in Sn. Half of Square.	Total No. of Observa- tions.	No. in Nn. Half of Square.	No. in Sn. Half of Square.	Total No. of Observa- tions.	No. in Nn. Half of Square.	No. in Sn. Half of Square.
N.En.	N.En.	—	—	—	—	—	—	7	6	1
"	S.En.	—	—	—	11	3	8	28	9	19
"	S.Wn.	—	—	—	—	—	—	10	7	3
"	S.	—	—	—	1	1	—	2	2	—
"	E.	—	—	—	2	1	1	4	3	1
		—	—	—	14	5	9	51	27	24
S.En.	N.En.	—	—	—	6	6	—	6	6	—
"	S.En.	—	—	—	—	—	—	32	6	26
"	S.Wn.	1	1	—	5	3	2	20	12	8
"	N.Wn.	—	—	—	—	—	—	2	2	—
"	S.	—	—	—	2	1	1	6	5	1
"	E.	—	—	—	—	—	—	2	2	—
		1	1	—	13	10	3	68	33	35
S.Wn.	N.En.	1	1	—	—	—	—	5	5	—
"	S.En.	1	1	—	5	5	—	14	3	11
"	S.Wn.	—	—	—	—	—	—	6	5	1
"	N.Wn.	—	—	—	—	—	—	1	1	—
"	En.	—	—	—	1	1	—	—	—	—
		2	2	—	6	6	—	26	14	12
N.Wn.	N.En.	—	—	—	—	—	—	2	2	—
"	S.En.	—	—	—	1	—	1	7	—	7
"	S.Wn.	—	—	—	—	—	—	1	1	—
"	N.Wn.	—	—	—	—	—	—	3	3	—
"	S.	—	—	—	—	—	—	1	1	—
"	E.	—	—	—	1	1	—	—	—	—
		—	—	—	2	1	1	14	7	7

NOTE.—The following are the percentages of upper clouds from the various quarters, 159 being the total number of observations:—

From the N.En. quarter 32% being — 7% since September.

" S.En. " 43 " " + 16 " "

" S.Wn. " 16 " " — 2 " "

" N.Wn. " 9 " " — 7 " "

There have been 32 more observations of the motion of upper clouds in October than in September, of which 24 were in the Sn. half of the square, and now they are pretty equally divided between the Nn. and Sn. halves, there being 81 in the Nn. and 78 in the Sn. In the Nn. half of the square the largest number of upper clouds from any one quarter with any one wind was 12 from S.E., wind S.Wy., whilst in the Sn. half there were 26 from S.E., wind S.Ely. The above percentages show that upper clouds from S.E. have greatly increased, whilst those from N.E. and N.W. have decreased, as though there were a freer course for the upper current to the Nd. than to the Sd. since the sun crossed the Equator.

The following remarks on Clouds have been extracted from the logs:—

Latitude.	Sub-square.	Remarks on Clouds. NOTE. A bar, thus —, separates the Remarks from different Logs.
9° to 10° N.	93	Cir. from W.S.W., cum. from E.N.E., wind N. b. E.
	95	Cir.-c. from E. b. N.—Cir.-c. from N. b. W., no wind.*—Cir.-c. from N. b. W., other clouds from E. b. N., wind N.E. b. E.—Cir.-c. from N. b. W. and N. b. E., wind N.N.W.—Cir.-c. from E., wind S.W.
	96	Clouds from various directions, wind E.N.E.—Clouds from various directions, wind E. b. S.
	97	Cir. from S.S.W., no wind.—Clouds from various directions, wind E. b. S.
8° - 9° N.	98	Clouds from N. b. W., no wind.—Clouds from N.E., no wind.
	80	Motionless nim. like many icebergs piled on each other, standing in the N.E., and reaching about 60° above the horizon; they were dyed blood-red by the sinking sun.
	81	Upper clouds from N.N.W., wind variable Wly.—Lower clouds from S.E. b. S., no wind.—Heavy inky clouds with l. in S.W., wind N.N.E.—Lower clouds from S., wind S.E.
	82	Cum. on horizon all round, wind E.S.E.
	84	Very dense black clouds constantly rising from all points except the W., bringing torrents of rain, wind E. b. N.—Sky generally clear overhead, dense clouds on horizon, no wind.—Thickly-packed cum.-s. near horizon from S. b. E. to E. b. N.
	85	Upper clouds from S. b. E. and N.E. b. N., no wind.—Heavy black clouds in S. with l.—Clouds from various directions, no wind; again, with wind N.N.E., and again, three times, with wind variable.
	86	Clouds from various directions, wind N.E. b. E.—Cum.-s. round horizon, no wind (two entries).
	87	A huge stationary cum.-s. with nim. below it in the N.E.—Cir. from N.N.E. and E.S.E., wind N.N.W.
7° - 8° N.	89	Cir.-c. from E., wind E.N.E.
	73	Upper clouds from S.S.E., no wind (two entries).—Upper clouds from S.W. b. S., lower from N.E. b. N., wind E. b. N.—Heavy thunder clouds all round horizon, zenith perfectly clear, no wind.—Clouds from N.E., no wind.
	74	Cir.-c., cir., and cir.-s. from S.E. b. S., wind S.W.—Clouds rapidly from S.E., wind S.—Clouds from various directions, no wind.—Cir.-c. from N.E. b. N. and S. b. E., wind S.E. b. S.—Cir.-c. from E. by N. and S.E. b. S., wind E.S.E.
	75	Upper clouds from S.E. b. E., wind variable.—Clouds from N. b. W., no wind.—Higher stratum of upper clouds, stationary, next stratum from S.S.E., wind S.W.
	76	Clouds from various directions, wind E. b. N.
	77	Various forms of upper clouds from W. b. S., wind S. b. W.
	78	Clouds from S.E. b. E. and N.W. b. W., wind S. b. W.—Clouds from various directions, no wind (two entries).
	61	Scud crossing; upper from N., lower from S.S.W., wind S. b. E.
6° - 7° N.	62	Heavy scud from N.E. b. N., wind S.E. b. S.
	63	Clouds from N.E. b. E., wind variable. Cir.-s. from N.E. b. E., wind variable.—Clouds from various directions, wind S.S.E.—Clouds from S.E. b. E., wind variable. Brisk "carry" from E.S.E., no wind.
	64	Clouds from S. b. E., N.E. b. N., and N.W. b. W., no wind. Clouds from N.W. b. W. and S. b. E., wind E.S.E.—Clouds all ways, no wind.
	65	Lower clouds changing their course very often, sometimes from N.E., E., and S.E., wind variable and light.—Cir.-s. from E. b. N., cum. from S.E. b. E., and light str. from S. b. W., wind light S.W.
	66	Clouds from various directions.—Cum. and nim. from S. b. E.; they appear stopped just to the Nd. of the ship, wind Wly.—Clouds from S. b. E., no wind. Upper clouds from S.W. b. S., lower from S. b. E., wind variable.—Clouds from S.E. b. S., no wind.—Clouds from S.E. b. S., wind variable.

* No wind, means that it was calm at the time.

Latitude.	Sub-square.	Remarks on Clouds. NOTE. A bar, thus —, separates the Remarks from different Logs.
6° to 7° N. <i>continued.</i>	67	Clouds from S.E. b. E., wind variable.
	68	Clouds from N.E. b. N., wind variable.
	69	Cir.-c. from E., wind S.W. (two entries).
	50	Almost total absence of clouds all night.—Clouds in three tiers: upper, cir. stationary; middle, cir. from E.S.E.; lower, a heavier cir. from S.S.W.; wind S.S.W. Heavy nim. came up from N.N.E., and deluged us for two hours, wind S.—Cir. from S.W., wind variable.
5° - 6° N.	52	Upper clouds from S.E. b. S. and S.W. b. S., wind S.W. b. S.—Cir. from S.E. b. S., lower clouds from E. b. N., wind N.N.W.
	53	Clouds from N.E. slowly (two entries). Clouds from Ed., wind S.S.E.—Cir.-s., cir.-c., and cir. from S.E., wind S.S.E.
	54	Cir.-c. from E. b. N., cir.-s. from S.E. b. E., wind N.E. b. E.—Clouds from W. b. S. and N.E. b. N., wind S.S.W. (two entries). Clouds from E.S.E., no wind.*—Clouds from all directions, wind S. b. E.
	55	Sky covered with "mares' tails."—Str. from the Ed., making halos and burs round the moon, wind variable.—Upper clouds from S.W. b. S., wind variable.
	57	Throughout the 9th sky overspread with cir. from N. b. E., wind S.—The cum. that has been all day moving from S. now returning, wind S.—Clouds rapidly from E. b. S., wind E.S.E., l.
	40	Clouds from Sd., wind E.S.E.—Clouds from different directions, wind S.S.W.
	42	Upper clouds from N.N.E.
	43	Clouds at noon large and dense; they evaporated after sunset, leaving a nearly cloudless sky.—Clouds from several directions, high clouds from E. b. S., wind variable.—Cum.-s. from N.E.
4° - 5° N.	44	Cum. from S.E. b. E., str. from N.E. b. N., wind S.E.—Cum. from E. b. S., nim. from N.E. b. E., wind S.E.—Cir.-s. from Sd., no wind.—Clouds from Sd., wind S.W.—Clouds from S.W. b. S., no wind.
	45	Upper clouds from E. b. N., lower from S. b. E., wind variable.—Cum.-s. round horizon, wind variable, Ely.
	48	Clouds from various directions (two entries).
	49	Cir. from N. b. W., str. from E. b. N., wind S.E. b. S.
3° - 4° N.	30	Cir.-c. from Sd., no wind.—Clouds from Wd., wind Nly. Clouds from Wd. and Nd., wind variable. Clouds stationary, heaped on horizon, wind W.N.W. to W. b. S., 1 to 2.
	31	Upper scud swift from N., lower scud slow with the wind (S. b. E., 4).
	32	Cir.-c. from E., wind S. b. E.—Cir.-c. from Nd.
	33	11th, 1856. A very large cumulus passed over, whirling about in a strange manner, probably occasioned by a portion of it rising up to or near the upper stratum, which does not appear to be very high, and is moving from the Nd., wind S.S.E. 4.—Cir.-c. from S. b. E. and S.W. b. S., wind S.E. b. S.
	34	Clouds from N.E. b. N., wind variable.
	35	Upper clouds from E. b. N., no wind.
	39	Cir. fast from N.W. b. W., wind E. b. S.
	21	Scud steady from N., wind S.—Upper clouds from N.E. b. E.
2° - 3° N.	23	Clouds from W. b. S., wind S. b. W.
	26	Cum.-s. from E. b. N., nim. from S. b. W., wind S. b. W.
	27	Upper clouds from N.W. b. W. and S.E. b. E., wind E. b. N.
	12	Clouds from N., wind East.
1° - 2° N.	13	For the first time since entering the S.E. Trade, met with an upper stratum of clouds from N.N.E. (ship from S.)
	17	Cum. S. from N., wind S.E. b. S.
	02	A bank of nim. in Nn. horizon dispersing, wind S.S.E.
	05	Patches of cum. heavily packed in N.N.W. and S.E.
0° - 1° N.	07	Upper clouds from E. b. S. and S. b. E., wind S.E.

* No wind, means that it was calm at the time.

WEATHER.

TABLE 9.—LATERAL STRIPS.

Lateral Strips, being 10° of Longitude by 1° of Latitude.				Thunder. (t.) %	Lightning. (l.) %	Squalls. (q.) %	Rain. (r.) %	Mist or Haze. (m.) %	Dew. (w.) %
9° to 10° N.	-	-	-	3	16	19	20	7	1
8° - 9° N.	-	-	-	4	15	16	20	4	2
7° - 8° N.	-	-	-	5	12	14	27	3	2 3/4
6° - 7° N.	-	-	-	2	8	15	22	4	1 1/4
5° - 6° N.	-	-	-	2	5	17	26	5	1 1/2
4° - 5° N.	-	-	-	3 1/4	3	20	24	5	3 3/4
3° - 4° N.	-	-	-	1 1/2	2	15	16	5	1 1/2
2° - 3° N.	-	-	-	1	2 3/4	7	6	5	2
1° - 2° N.	-	-	-	1 1/3	1	3	3	3	1
0° - 1° N.	-	-	-	-	1 1/2	3	1 1/2	4	3

TABLE 10.—VERTICAL STRIPS.

Vertical Strips, being 10° of Latitude by 1° of Longitude.				Thunder. (t.) %	Lightning. (l.) %	Squalls. (q.) %	Rain. (r.) %	Mist or Haze. (m.) %	Dew. (w.) %
20° to 21° W.	-	-	-	2	5	5	12	4	1 1/2
21° - 22° W.	-	-	-	2	11	13	20	3	1 1/2
22° - 23° W.	-	-	-	3	8	8	17	5	2 3/4
23° - 24° W.	-	-	-	3	8	17	22	4	2 3/4
24° - 25° W.	-	-	-	2	5	14	19	3	1
25° - 26° W.	-	-	-	2	9	16	20	6	1 1/4
26° - 27° W.	-	-	-	2	9	19	22	4	3
27° - 28° W.	-	-	-	2	6	18	14	5	2
28° - 29° W.	-	-	-	3 1/4	4	12	23	7	1 1/2
29° - 30° W.	-	-	-	-	3	9	14	3	-

TABLE 11.—LIGHTNING.

This Table gives the bearing on which Lightning was seen in the various Lateral Strips. Only the bearings recorded as actually N., S., E., or W. have been given to those points.

Lateral Strips, being 10° of Longitude by 1° of Latitude.				Number of Observations.	N.	N.Ely.	E.	S.Ely.	S.	S.Wly.	W.	N.Wly.	All round	No direction given.
9° to 10° N.	-	-	-	34	-	3	4	4	5	11	1	3	1	2
8° - 9° N.	-	-	-	26	-	8	-	6	3	4	1	1	1	2
7° - 8° N.	-	-	-	33	7	7	2	5	2	2	-	1	2	5
6° - 7° N.	-	-	-	29	2	9	1	7	-	-	1	2	6	1
5° - 6° N.	-	-	-	13	1	4	3	2	1	-	-	1	-	1
4° - 5° N.	-	-	-	8	1	4	-	1	1	-	-	-	-	1
3° - 4° N.	-	-	-	3	-	-	1	-	1	-	-	1	-	-
2° - 3° N.	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1° - 2° N.	-	-	-	-	-	-	-	-	-	-	-	-	-	-
0° - 1° N.	-	-	-	-	-	-	-	-	-	-	-	-	-	-
				146	11	35	11	25	13	17	3	9	10	12

The means of the various percentages in Table 9 compared with those for September show a very decided increase in the amount of unsettled weather. By comparing the means of individual strips, the greatest increase of thunder and lightning is shown to have taken place between 7° and 10° N. Squalls have increased most between 3° and 6° N., and by nearly the same amount between 8° and 10° N.

Between 6° and 8° N. 1 squall in 6 was heavy, between 4° and 10° N. they averaged 1 in 10. "Very heavy squalls" were remarked upon in sub-squares 96, 85, 63, and 17: the remarks are quoted in Table 3; that in s.-s. 96 seems to have been part of a hurricane.

Rain has increased between 1° and 8° N., chiefly between 3° and 8° N., it has decreased between 9° and 10° N. Mist has decreased in all strips, excepting that between 9° and 10° N., where it has increased; it will be noticed that this is where rain has decreased. Dew has increased slightly between 7° and 10° N., but decreased elsewhere. The largest percentage of dew is still over the coolest water, between 0° and 1° N.

By comparing Tables 1 and 9, it will be seen that there is the most lightning where the percentages of N.Ely. and S.Ely. winds are nearly equal, or a little to the Nd. of that latitude.

Table 10 shows the most unsettled weather between 21° and 27° W.

Table 11, compared with that for September, shows a very great increase in the number of times the bearing of lightning was taken. Between 8° and 10° N. it was most frequently seen on some Sly. bearing, whilst to the Sd. of 8° N. it was most frequently seen on some Nly. bearing. Between 6° and 7° N. (the calmest part of the Doldrum) it was seen six times "all round" the horizon. Since September the number of observations has increased on all bearings excepting West, most on the N.Ely. bearing which has 35 out of the 146 observations. In September it was remarked that for the first time lightning on some Wly. prevailed over that on some Ely. bearing, now that on some Ely. bearing very much prevails.

The following remarks on Weather have been extracted from the logs; they give the direction in which various kinds of lightning were seen, &c. :—

Latitude.	Sub-square.	Remarks on Weather.	
		NOTE. A bar, thus —, separates the Remarks from different Logs.	
9° to 10° N.	93	Sheet l. in N.W. Much sheet l. in W. and E. Corposants on main royal yard arms and mast head.—Oppressively hot.—Very much sheet l. in the S.—l. in S.S.E. for more than six hours.	
	94	A waterspout on lee beam, revolving as the hands of a watch, when first seen it bore W. b. S., ship's head S. b. E., wind E.	
	95	Sheet l. in S.S.W. Much sheet l. all round the horizon.—24th. The whole 24 hours squally unsettled weather with heavy showers and l.—Constant sheet l. from S.E. to S.W. Sheet l. from S.W.—Hot and scorching (two entries). Forked l. N.E. to N.W.—A waterspout in the S.W., lasting about seven minutes; it was apparently stationary, and began to disperse at the foot, the dispersion progressing upwards.	
	96	4 to 6 a.m., 19th, 1864. A hard close-reefed topsail gale backing from E. to S. round by the N., with heavy squalls and gusts. 7 a.m., gale abating. The mainsail and	

Latitude.	Sub-square.	Remarks on Weather. NOTE, A bar, thus —, separates the Remarks from different Logs.
		fore topmast staysail were blown away. (See Table 3 for further remarks on same gale, which seems to have been part of a hurricane.) The sun set in a close greasy-looking bank, with small inky-looking clouds above it, intermixed with long streaks of black. After 8 p.m. very much sheet l. in S.E. 10 p.m. Sheet l. in E., t. very distant in S.
8° to 9° N.	97	25th, 1862. A heavy thunderstorm right over the ship, with heavy rain and no wind, lasting half an hour. The t. and l. simultaneous; nothing could be heard for minutes together, with a blaze of light, followed by total darkness.
	98	Very fine; sun scorching hot.
	80	24th, 1868. During a heavy squall, accompanied by extremely heavy rain, four or five extremely heavy flashes of l. were seen overhead without the faintest sound of t., whereas other more distant flashes were accompanied by thunder.
	82	Large halo round the moon.
	83	Bright sheet l. in S.E.
7° - 8° N.	84	Several flashes of sheet l. in S.E.—Numerous waterspouts round.
	85	Very peculiar l. to the S.Ed., red dull sheets shooting up from the horizon.—Forked l. in N.E.
	86	Leaden glare to the Nd., with very heavy rainy appearances all round.
	87	Lightning in E.N.E., very bright, round, and smooth, resembling a globe of fire, suddenly appearing and then falling.—Dew throughout the day, especially towards sunset.
	72	Forked l.—Flash l. to Nd.—Four hours l. and r.
6° - 7° N.	73	Beautifully coloured circle or corona round the moon. Thunder and lightning all round.
	74	A small waterspout formed about a quarter of a mile to windward, and came very close; with the glass we could distinctly observe the wind or water whirling round against the sun or opposite to the motion of the hands of a watch; wind S. 23rd. One of the finest nights I ever saw in this latitude, wind S.S.E. 2.—Sheet l. in various parts about 30° above the horizon.
	77	Very fine clear night.
	78	Ugly-looking all round.—Much forked l. in N. and N.E., with a perfect deluge of rain. Halo round the moon.
	63	Thunder and lightning all round.—A lunar rainbow.
5° - 6° N.	64	Flashes of sheet l. in the N.E.—Large circle round moon.
	65	Pale weak l. in all directions for half an hour.—Heat drops (two entries). Halo round the moon, but the rays only towards the zenith and horizon.—Constant heavy rain (two entries).—4 hours incessant torrents of rain.—Very blue haze to the Ed.
	66	Halo and bur round moon.—23rd, 1864, a flash of l. to the N.Ed., shaped like a watch spring, coiled left-handed, going round from left to right, and other flashes to the Nd. like rockets or meteors, they were about 20° above the horizon, and the sky was clear in that direction.—Reflection of vivid sheet l. seen extending from N.W. b. N. to N.E. b. N., colour blue.—A peculiar arch-shaped cloud, centre bearing about N.E., and lightning about the sides.
	67	Thunder far to the Ed.—Very hot and sultry.
	68	Much sheet l. in all quarters.
4° - 5° N.	51	Very heavy rain from 2 a.m. to noon of the 18th.
	52	Constant rain for 12 hours.—A lunar rainbow. Bright clear weather (two entries).
	53	Distant t., making a hissing noise.
	54	Very fine (two entries).—Sheet l. in N.E.—All round the N. peals of t. with l. and r.
	55	Pale and weak l. in N.E.
2° - 3° N.	40	Large halo round the moon.
	42	Lunar rainbow of a pale greenish colour.—A most remarkable waterspout travelling with the wind in a N.N.Ely. direction, it lasted about three minutes.
	43	Sun shining intensely hot.
	23	Sun shining intensely hot, temperature in shade 83°.
	27	Everything out of the sunshine quite damp and clammy.
1° - 2° N.	18	Small halo round the moon.

GENERAL REMARKS.

The following extracts have been made from the "Remarks" in various logs:—

NATURAL HISTORY.

Latitude.	Sub-square.	Remarks on Natural History.
		<i>Land Birds and Insects.</i>
9° to 10° N.	90	Strong smell of land; <i>Butterflies</i> and <i>Land Birds</i> (<i>Falcon, Swallow, Turtle-dove, &c.</i>), came on board; wind N.E.
	92	Some three or four sorts of <i>Land Birds</i> .
	94	<i>Land Birds</i> ; one <i>Owl</i> and about 30 <i>Martins</i> , also a few <i>Butterflies</i> and <i>Dragonflies</i> ; wind E.N.E.
	95	Caught a <i>Plover</i> .—A <i>Sea-hawk</i> hovering over the ship.
	97	A small <i>Land Bird</i> .
8° - 9° N.	84	Another <i>Swallow</i> flew on board.
	85	Several <i>Martins</i> flying about; caught two, one apparently very young.
	86	One or two <i>Swallows</i> .
	87	Just before rain a beautiful <i>Butterfly</i> danced playfully along going rapidly to the Wd.; wind variable, Ely.
	73	A <i>Land Bird</i> .
7° - 8° N.	74	Two <i>Swallows</i> flying round the ship.—A <i>Land Bird</i> .
	75	Some <i>Swallows</i> .—Two <i>Swallows</i> , one completely exhausted; during the night it very voraciously swallowed small insects which were given to it.—A little before a squall at 4 p.m. caught a <i>Butterfly</i> ; a <i>Swallow</i> was seen flying round the ship.—Several <i>Dragonflies</i> and <i>Moths</i> about the ship; the dragonflies about 2 ins. long, and of a bright brown colour; the moths dark brown and black; they were about an inch across the wings.
	76	One small <i>Land Bird</i> and a <i>Locust</i> on board.
	60	Several <i>Swallows</i> caught.
	61	17th, 1857. A beautiful <i>Swallow</i> has been flying in and out of the cabin windows all the morning, and has picked up some flies and small cockroaches. Its head is like black velvet, neck brownish, back bright silvery blue, wings dark, belly white, neck under the bill reddish, tail dark and ends square when spread out, otherwise it has the proper swallow's tail. Our nearest land is Africa, 420 miles distant.— <i>Land Birds</i> still in company (two entries). Ship from the Nd.
6° - 7° N.	64	A <i>Swallow</i> .—A <i>Swallow</i> hovered round, and then took refuge on board.
	66	11th, 1858. A gray <i>Owl</i> settled on the stern boat.—A <i>Land Bird</i> about the size of a small pigeon settled on board; it was heavy flying, with some resemblance to the stork family, probably a bittern.—Some <i>Martins</i> flew on board.—A small <i>Land Bird</i> .
	67	A yellow <i>Butterfly</i> . A number of <i>Swallows</i> hovering about the ship for more than six hours.
	56	<i>Swallows</i> still hovering about. (Ship from Nd.)
	40	A <i>Martin</i> flying about the ship.
5° - 6° N.	42	<i>Land Birds</i> still about. (Ship from N.)
	49	<i>Swallows</i> still in company, but decreasing in number. Ship from Nd. (two entries).
4° - 5° N.		

Latitude.	Sub-square.	Remarks on Natural History.
3° to 4° N.	30 34	A small bird of the <i>Swallow</i> kind flew on board. 18th, 1856. Caught a common bank <i>Swallow</i> , in size, form, and plumage like the swallow so common in some parts of Britain, inhabiting and rearing their young in sand or gravel banks. <i>Note.</i> —The very large number of land birds and insects, which were most abundant in the Nn. part of the square, considered together with the strong smell of land in s.-s. 90, the great heat in the N.En. corner of the square, and the prevailing N.Ely. wind between 8° and 10° N., are all indications that the effects of the tornadoes which blow from Africa in October reach Square 3, even though the nearest point of that square is 240 miles from the land. It has already been remarked that the difference between the dry and damp bulb thermometers has greatly increased since September in the N.En. corner of the square.
Cetacea.		
7° - 8° N.	74	Several <i>Whales</i> .
6° - 7° N.	68	4th, 1864. Several <i>Whales</i> around the ship, all moving to the Nd.
2° - 3° N.	27	A small school of <i>Whales</i> .
8° - 9° N.	86	<i>Blackfish</i> going to the Ed., wind E.N.E.
6° - 7° N.	64	Shoal of <i>Blackfish</i> going N.N.E., wind S.E. by E.
3° - 4° N.	36	A large shoal of <i>Blackfish</i> and <i>Porpoises</i> going N.W., wind S.E. by E.
2° - 3° N.	20	A solitary <i>Blackfish</i> .
3° - 10° N.	-	<i>Porpoises</i> were seen in sub-squares 95,* 87, 73, 74, 64, 52, 53, 36. (See remarks on blackfish s.-s. 36.)
Fish, &c.		
1° - 9° N.	-	<i>Albicores</i> were seen in sub-squares 87, 62, 65, 41, 23, 19. In 65 they were called <i>Tunny</i> .
5° - 9° N.	-	<i>Bonitos</i> " 85, 62, 64, 53.
1° - 7° N.	-	<i>Dolphins</i> or <i>Coryphæna</i> " 65, 46, 21, 19.
0° - 10° N.	-	<i>Flying Fish</i> " 97, 62, 65, 57, 45, 36, 24, 25, 29, 13, 16, 18 (3 times), 19, 19, 03, 04. In 65 they were tiny, in 29 small.
3° - 9° N.	-	<i>Sharks</i> were seen in sub-squares 84, 74 (twice), 75, 55, 40, 41, 45, 31, 34. In 45 and 34 they were large.
1° - 10° N.	-	<i>Fish</i> (no names given) " 98, 84, 89, 53 (twice), 39, 16.
0° - 7° N.	-	<i>Portuguese-men-of-war</i> " 66, 56, 42, 16, 16, 04. In 66 they were small.
Remarks		
9° - 10° N.	96	Many <i>Sea-anemones</i> , <i>Sea-nettles</i> , &c.
8° - 9° N.	86	7th, 1857. Towed a fine net lined with bunting during a very light wind and caught several specimens of <i>Acalepha</i> , <i>Calanus</i> and <i>Shells</i> . <i>Myracia efferata</i> and <i>Euchaeta diadema</i> were both found with eggs attached; in May they were found in the same condition. Many <i>Animalecules</i> were playing on the glassy surface of the sea, but we did not succeed in catching any.
	87	Water coated with a species of oil or spawn.
6° - 7° N.	64	A quantity of yellowish matter, resembling fish spawn, floating on the sea.

* One dot under a sub-square indicates that the creatures were abundant; two dots very abundant, &c.

Latitude.	Sub-square.	Remarks on Natural History.
6° to 7° N. <i>continued.</i>	65 66	10th, 1857. Found a brilliant <i>Sapphirinia coruscans</i> , many varieties of <i>Calanus</i> , <i>Myracia efferata</i> , <i>Euchaeta diadema</i> , <i>Pteropoda criseis</i> , &c. &c. Sea abounding with small <i>Portuguese-men-of-war</i> , and with <i>Salpæ</i> which kept shooting up to the surface; also several long-legged creatures which ran on the surface of the water and then disappeared, but how could not be seen.
5° - 6° N.	51 54	A small <i>Sword fish</i> , 7 or 8 feet long, in the wake for 10 minutes. A quantity of <i>Mollusks</i> .
3° - 4° N.	34 35	Ocean impregnated with <i>Medusa</i> . Caught some fine specimens of the <i>Ianthina cerulea</i> , or ocean shells.—Immense numbers of very small <i>Jelly fish</i> . Sea covered with small <i>Blubber</i> , like the Portuguese men-of-war, but much smaller.
2° - 3° N. 1° - 2° N.	25 11	Immense number of very small <i>Jelly fish</i> . Water literally swarming with diminutive "slob like" animals, about an inch or less long, and $\frac{1}{4}$ or $\frac{1}{3}$ of an inch thick. They had a small black spot at their lower ends. Put a few into a clear glass bottle.

Sea Birds.

0° to 10° N. - - *Stormy Petrels* (Mother Carey's Chickens) were seen in thirty-five sub-squares, and two or three times in several of them. They were abundant in nineteen sub-squares, and in great numbers in a ship's wake in sub-square 32; so that the small *Jelly fish*, &c. &c. seen between 3° and 4° N. were probably good food for them. They were pretty equally spread over the whole square.
A *Booby* was seen in sub-square 82, and another in sub-square 09.
Birds (supposed to have been Sea Birds) were seen in sub-squares 84,* 74, 76, 52, 55, 56, 49, 31, 33, 37, 37, 21, 23, 12, and 18. In 76 they were following a shoal of fish. In 55 they were long-winged, and going to the S.Wd. In 56 they were large and brown. In 49 flocks of *Terns*. In 33 numerous fishing birds. In 37 a dark bird hovering over ship and trying to alight. *Note.*—*Sea Birds*, like the stormy petrels, abounded between 3° and 4° N. where food seemed to be very abundant.

* One dot under a sub-square indicates that the creatures were abundant; two dots very abundant, &c.

FALLING STARS.

There are 23 entries of Falling Stars, distributed over 10 years between 1856 and 1871. Of these five were in 1859, four in each of the years 1864 and 1866, three in 1858, two in 1870, and only one in each of the other five years. The following remarks seem worthy of extraction:—

Sub-square.	Hour.	Day.	Year.	Remarks on Falling Stars.
39	4 a.m.	28th	1856	Several shooting stars to the Sd.
25	Midt.	7th	1858	Stars shooting to W.S.W.
64	4 a.m.	10th	1858	Stars shooting and falling to the N.E.
75	Midt.	13th	1858	" " " to the Nd.

FALLING STARS—continued.

Sub-square.	Hour.	Day.	Year.	Remarks on Falling Stars.
07	10 p.m.	22nd	1859	Stars shooting in great numbers from zenith towards N.E.
86	8 p.m.	30th	1859	Stars shooting in different directions.
37	10 p.m.	1st	1864	Stars shooting from N.E. and E.
68	Midt.	4th	1864	Stars shooting to the Nd.
98	Midt.	7th	1864	Stars shooting to the N.W.
08	2 a.m.	22nd	1866	Several meteors to the S.E.
96	—	29th	1866	Several shooting stars from N.E. to S. passing through the belt of Orion.
75	Midt.	31st	1866	Stars shooting in all directions.
74	10 p.m.	22nd	1870	Several stars shooting from E. to W.
67	Midt.	2nd	1871	Several meteors falling to the S.Wd.

TEMPERATURE OF RAIN AND AIR.

Sub-square.	Temperature of Rain.	Temperature of Air.
64	74°5	79°0
	75°0	79°5 At noon.
51	72°0	72°9
52	73°0	76°5
40	73°5	74°9
44	74°3	75°8
	6)22°3	6)38°6
	73°7	76°4 Difference 2°·7

Sub-square.	VARIOUS.
90	Strong smell of land. (Wind N.Ely.)
86	8 p.m., 13th, 1858. Comet indistinctly seen through the gloom.
74	7 p.m., 4th, 1858. Comet very bright in the constellation Boötes, about 60° from Mica and 56° from Antares.—Noon. Thermometer in sun 116°, in shade 83°·4.
65	8 p.m., 10th, 1858. The comet seems to be closer and more bright each night, the tail extending E.N.E., and plainly visible to the naked eye for 30°.
66	4th, 1858. A comet visible, its tail to the N.N.E.
52	1.30 p.m., 1858. Planet Venus plainly visible in bright sunshine.
53	A great many pink and green patches floating on the surface of the sea.
55	6 p.m., 8th, 1858. Comet even brighter than last night; it appears to be about 4° more to the E.S.E. each night; when on the horizon its tail had the appearance of half a lunar rainbow.
43	Noon, 3rd, 1870. Thirty-one vessels in company, all outward bound, wind S.S.E. At 6 p.m. twenty-nine seen on starboard tack, wind S.S.W.
44	7 p.m., 8th, 1858. Comet very bright (tail 19° 15' long), being 13° 5' from Arcturus, and 42° 57' from Antares; measurements taken by a sextant.
33	5 p.m., 9th, 1856. In latitude 3° 23' N., longitude 23° 47' W., about the position assigned to Caesar's Breakers, a good look out kept, but nothing strange appeared.—2 a.m., 1st, 1858. Passed the position assigned to Caesar's Breakers, saw no indication of danger.

Sub-square.	VARIOUS.
25	6 p.m., 7th, 1858. Comet as bright as a star of the first magnitude, with tail plainly visible for 18°, and forming a sort of arch.
26	7 p.m., 13th, 1858. Comet very bright, being 60° 3' distant from Vega and 20° 30' from Antares.
09	At 11.30 p.m., 19th, 1859, felt the shock of an earthquake which lasted about three seconds, the ship felt as if grating over rocks, the helmsman felt the wheel shake in his hand, bar. 29·906, sea temperature 78°, air 80°, damp bulb 77°. The Captain says, "Being on deck myself at the time I can vouch for the truth of this statement." The ship seems to have been in about 0° 40' N. and 29° 20' W. at the time, or about 15 miles to the Sd. of St. Paul's Rocks. The weather was very fine, the only entry being blue sky, and the amount of cloud 2.; the wind seems to have been S.Ely. and puffy. (It will be seen that there was an earthquake in the same sub-square in January of the same year.)

BEST ROUTES FOR CROSSING THE EQUATOR.

Appendix B. shows that in October the mean force of all winds is very decidedly stronger in the Wn. than in the En. half of Square 39, and on comparing the force of wind from *each quarter* in each 2° strip, the various winds of the Wn. half are found to be much stronger than those of the En. The En. half has also twice as much calm as the Wn.

Appendix B. also shows that there is much more S.Ely. wind in the Wn. than in the En. half of Square 39.

As merely recording the direction of wind for the four quarters of the compass is not sufficiently near to enable the Navigator to judge of the advantages which one half of the square may have over the other with regard to direction, the following Table is constructed.

TABLE 12.

The Direction of the three Prevailing Winds of each quarter of the compass in each half of Square 39. They are in the order of their prevalence. A dash under a letter or figure indicates extreme prevalence.

Latitude.	N. to E. b. N., or N.Ely. Winds.		E. to S. b. E., or S.Ely. Winds.		S. to W. b. S., or S.Wly. Winds.		W. to N. by W., or N.Wly. Winds.	
	Wn. half	En. half	Wn. half	En. half	Wn. half	En. half	Wn. half	En. half
	25° to 30° W.	20° to 25° W.	25° to 30° W.	20° to 25° W.	25° to 30° W.	20° to 25° W.	25° to 30° W.	20° to 25° W.
	Points from North.	Points from North.	Points from South.	Points from South.	Points from South.	Points from South.	Points from North.	Points from North.
18° to 20° N.	4, 5, 6	2, 4, 3	8, 7, 6	7, 8, 1	S., 4, —	4, 3, 2	— — —	6, 7, 8
16° — 18° N.	4, 5, 6	2, 4, 6	8, 7, 6	8, 7, —	5, 7, 6	— — —	— — —	— — —
14° — 16° N.	6, 5, 4	4, N., 3	8, 7, 6	8, 7, 2	4, — —	— — —	8, 7, 6	6, — —
12° — 14° N.	4, 6, 3	2, 3, 4	8, 7, 6	8, 1, 7	S., 1, 6	3, 4, 1	2, 1, —	1, 2, 4
10° — 12° N.	3, 7, 4	3, 1, 2	8, 7, 6	8, 1, 2	2, 4, 1	S., 5, 6	1, 2, 3	1, 4, 8

Table 12 shows that the three prevailing N.Ely. and S.Ely. winds of the Wn. half are more Ely. than those of the En. half of the square. This holds good in each of the five strips, but especially in the Sn. part of the square.

The accompanying Chart for October, together with Table 2 and the prevailing wind-arrows of the Diagram in the lower right-hand corner of the Chart, show that the winds are now stronger on the Wn. than on the En. side of Square 3, though this was not the case in September. The red sections in the current circles, and the current-arrows on the Diagram of sea isotherms show that Ely. currents still prevail between 4° and 10° N., whilst Wly. are most frequent between 0° and 4° N. They do not seem to be quite so strong as in September.

Appendix C. shows that in October there is scarcely any difference in the mean directions of the prevailing winds in the En. and Wn. parts of Square 303. It is however slightly more Ely. in its En. than in its Wn. part. The comparison is best made by running a pencil line down each Table, and making it pass through the largest percentage for each degree of latitude. By comparing the mean forces for each degree of latitude, it is shown that off Cape St. Roque (between 4° and 6° S.), the winds are stronger in the Wn. than in the En. part of the square, but weaker in all other latitudes, especially between 7° and 8° S.

From the above facts it seems right that the *Outward-bound* ship should certainly pass to the Wd. of the Cape Verds, and when the Sly. wind sets in, stand to the S.Ed. until the most Southing can be made on the port tack. The prevailing wind arrows on the Diagram show that the S.E. Trade is more Ely., and stronger on the Wn. than on the En. side of Square 3, so that she may expect the course and distance to improve as she progresses to the S.Wd. After crossing the Equator the wind is found to be slightly more Ely., and stronger to the Ed. than to the Wd. of 33° W. The ship, "Earl Elgin," Capt. Reed, which had the earthquake near St. Paul's Rocks, crossed the Equator on the 20th, in $30^{\circ} 16'$ W. with a nice breeze from S.E. by S., (true), drawing more Ely. as she made Southing; she was in $2^{\circ} 3'$ S., $32^{\circ} 3'$ W. on the 21st; in $3^{\circ} 12'$ S., $31^{\circ} 45'$ W. on the 22nd, having stood to the N.Ed. for three hours to avoid Fernando Noronha; in $5^{\circ} 42'$ S., $32^{\circ} 37'$ W. on the 23rd; in $8^{\circ} 46'$ S., $32^{\circ} 36'$ W. on the 24th; and in $12^{\circ} 7'$ S. $32^{\circ} 26'$ W. on the 25th. Near the Equator the current was about 18 miles to the Wd. in 24 hours, and became weaker as she made southing. The weather was generally fine and sea comparatively smooth, so that her experience goes to show that a Wly. crossing need not be feared by a good ship in October.

The *Homeward-bound* ship should cross the Equator to the Wd. of 24° W., making a Nly. course, she should pass into Square 39 to the Wd. of 25° W., where it has been shown that she will have stronger and more Ely. winds than in the En. half of the square.

NOVEMBER.

Barometer.—The isobars (see the Diagram in the lower right-hand corner of the Chart), show that the highest pressure has now shifted from the S.En. to the N.Wn. corner of the square, whilst the lowest has gone from its N.Wn. corner to its Wn. side.

The highest mean pressure in the lateral strips (29.948) is now between 9° and 10° N., whilst the lowest (29.928) is between 3° and 7° N. The isobars run more N. and S., and the prevailing S.Ely. wind is more Ely. than in previous months, so that the range of pressure is more in an Ely. and Wly. direction than it was during the Sly. and S.Wly. winds of the few previous months.

Pressure has decreased generally since October. The Mean for the whole square is 29.934, the lowest monthly mean during the prevalence of Sly. winds in the square; it is .019 in. lower than that for October. By comparing the changes in the various lateral strips, it is found that there has not been any change between 9° and 10° N.; between 7° and 9° N. it amounts to $-.008$, between 5° and 7° N. to $-.019$, between 1° and 5° N. to $-.024$, whilst between 0° and 1° N. it amounts to $-.037$. The changes in the mean pressure of vertical strips show that there has been a much greater decrease on the Wn. than on the En. side of the square. This is well shown by comparing the isobars of November with those of October. A comparison of the mean pressures for the various 2° squares shows that the greatest decrease has taken place in its S.Wn. part, as if the action of the sun (now well to the Sd.) on S. America, were affecting the pressure of that part of the Square.

Air Temperature has decreased in the Nn. and increased in the Sn. part of the square, the change amounting to $-0^{\circ}.8$ between 8° and 10° N., whilst there has been an average increase of $0^{\circ}.6$ between 0° and 4° N.

The Mean Temperature for the square ($79^{\circ}.5$) shows an increase of $0^{\circ}.1$ since October. The isotherms are very similar to those for October, and still show exceptional heat in the N.En. corner of the Square, where the difference of dry and damp bulbs still continues greater than elsewhere in the square. The fresh N.E. wind in the N.Wn. corner of the square (in s.-s. 99 its mean force for the month is 4.8), brings with it cooler air, so that the isotherm of 79° just shows there whilst in the same latitude the N.En. corner has a temperature of 83° , and, as in October, the wind still continues to blow from a hotter to a colder region.

Dry and Damp Bulbs.—The least mean difference of dry and damp bulbs ($3^{\circ}.0$) is between 5° and 6° N., or one degree to the Sd. of its position in September, whilst the greatest ($3^{\circ}.6$) is still between 1° and 2° N. It amounts to $3^{\circ}.5$ between 8° and 10° N. In s.-s. 90 it is $5^{\circ}.4$ from the mean of three observations, and in s.-s. 80 it is $4^{\circ}.7$ from

the mean of eight observations, showing the effect of heated air from Africa. The difference has very slightly increased between 6° and 10° N., but decreased to a greater extent between 0° and 6° N. Between 0° and 3° N. the change amounts to -0°·4, showing a great increase of moisture in the air at the Nn. verge of the S.E. Trade.

The Mean Difference for the whole Square (3°·4) shows a decrease of 0°·1 since October. A comparison of the vertical strips shows that the change is chiefly due to a decrease on the En. side of the Square.

Sea Temperature.—The isotherms of sea temperature still agree with those of the air, in showing that the largest amount of heat is in the N.En. corner of the square. This heat is probably due to the hot air coming in from Africa, combined with the effect of the last of the Ely. current which still shows there. The isotherms of both air and sea in the N.En. corner are still nearly at right angles to the hot N.Ely. wind which prevails there. (See the Diagrams for October and November.) Sea Temperature has decreased in the Nn. and increased in the Sn. part of the square. The change amounts to -0°·5 between 9° and 10° N., and to +0°·6 between 0° and 2° N.

The vertical strips show a slight increase in the En. and no change in the Wn. half of the square. The Mean Surface Temperature for the whole square 80°·6 shows only an increase of 0°·1 since October, which agrees with that of the air.

Specific Gravity.—The lowest specific gravity of the sea (1·0262) is between 5° and 6° N., it increases to 1·0267 between 9° and 10° N., and to 1·0274 between 1° and 2° N. By comparing the means for various strips with those for October, it is shown that there has been a general increase in the specific gravity, excepting between 4° and 5° N. where it has decreased ·0001. The greatest increase has been between 6° and 8° N., and again, between 1° and 4° N. where the change amounts to +·0004. The specific gravity of the En. half of the square is still decidedly less than that of the Wn., this does not seem to depend on the difference in the percentage of rain there.

The Mean for the whole square (1·0268) shows an increase of ·0003 since October.

WIND.

TABLE 1.—LATERAL STRIPS.

Lateral Strips. 10° of Longitude by 1° of Latitude.	No. of Observa- tions.	Mean Force of Strip.	N. to E. by N. or N.Ely.		E. to S. by E. or S.Ely.		S. to W. by S. or S.Wly.		W. to N. by W. or N.Wly.		Variables.		Calms.	Prevailing Wind.		Strongest Wind.*	
			%	Mean Force.	%	Mean Force.	%	Mean Force.	%	Mean Force.	%	Mean Force.		No. of Observations. Direction.	Mean Force.	No. of Observations. Direction.	Mean Force.
9° to 10° N. -	263	3·6	62	4·1	23	3·5	4	2·6	1	2·5	5	2·3	5	E. by N. ³²	4·0	N. ²	4·5
8° - 9° N. -	321	3·1	52	3·8	26	3·0	4	2·1	2	1·9	9	2·1	7	E. by N. ³³	3·3	N. by E. ¹¹	4·5
7° - 8° N. -	419	2·4	37	3·1	34	2·5	7	2·1	3	1·4	10	2·3	9	E. by S. ³⁶	2·8	N.N.E. ¹⁵	3·7
6° - 7° N. -	535	2·4	33	2·8	39	2·8	9	2·4	3	1·9	6	2·0	10	E. by S. ³⁷	3·4	S. by W. ⁴	4·0
5° - 6° N. -	557	2·3	21	2·6	44	2·8	12	2·6	3	1·7	9	2·0	11	S.E. by E. ³⁶	3·1	W.S.W. ³	3·3
4° - 5° N. -	528	2·6	8	2·8	62	3·0	12	2·8	2	2·1	5	2·7	11	S.S.E. ⁷¹	2·7	N.E. by N. ³	4·0
3° - 4° N. -	413	3·4	5	2·8	78	3·5	10	3·5	—	—	5	2·9	2	S.E. by S. ⁷⁴	3·9	S.E. by S. ⁷⁴	3·9
2° - 3° N. -	353	3·7	2	3·0	84	3·9	8	3·8	1	5·0	1	1·4	4	S.S.E. ⁷¹	4·0	S. ¹⁷	4·2
1° - 2° N. -	273	4·1	1	4·5	97	4·1	1	4·3	—	—	1	3·0	—	S.E. by S. ⁶⁹	4·2	S. ³	4·3
0° - 1° N. -	237	4·2	—	—	97	4·2	1	4·2	—	—	2	3·5	—	S.E. by S. ⁶⁹	4·0	E.S.E. ¹⁶	4·5

TABLE 2.—VERTICAL STRIPS.

Vertical Strips. 10° of Latitude by 1° of Longitude.	No. of Observations.	Mean Force of Strip.	N. to E. by N. or N.Ely.		E. to S. by E. or S.Ely.		S. to W. by S. or S.Wly.		W. to N. by W. or N.Wly.		Variables.		Calms.	Prevailing Wind.		Strongest Wind.*			
			%	Mean Force.	%	Mean Force.	%	Mean Force.	%	Mean Force.	%	Mean Force.		%	Mean Force.	No. of Observations. Direction.	Mean Force.	No. of Observations. Direction.	Mean Force.
20° to 21° W.	193	2·6	19	2·7	48	2·9	16	3·2	4	1·5	5	2·0	8	¹⁶ S.E.	3·1	⁸ S. by W.	3·9		
21° - 22° W.	258	2·9	20	3·1	55	3·3	12	2·6	3	2·6	2	2·5	8	³⁴ S.E.	3·5	²¹ S.E. by S.	4·0		
22° - 23° W.	258	3·1	22	3·6	60	3·4	7	3·0	1	1·0	5	1·8	5	³¹ S.E.	3·7	¹⁰ N.E. by E.	4·9		
23° - 24° W.	506	2·7	22	3·3	49	3·1	12	2·5	2	1·8	6	2·2	9	⁶⁸ S.S.E.	2·9	²⁵ E. by N.	3·6		
24° - 25° W.	634	2·9	25	3·3	50	3·2	9	2·8	3	2·1	7	2·2	6	⁵⁴ S.S.E.	3·1	¹⁰ N. by E.	4·0		
25° - 26° W.	586	3·1	24	3·3	52	3·6	8	2·8	2	1·5	6	2·3	8	⁵⁶ S.E. by S.	3·7	⁵⁶ S.E. by S.	3·7		
26° - 27° W.	512	2·9	24	3·2	55	3·4	5	2·7	1	1·7	7	2·3	8	⁶¹ S.E. by S.	3·6	⁸ N.N.E.	4·3		
27° - 28° W.	379	3·4	19	3·5	68	3·7	3	3·4	1	2·3	3	2·5	6	⁶⁷ S.E. by S.	3·8	⁵¹ S.	4·2		
28° - 29° W.	368	3·1	15	3·0	71	3·4	4	2·7	1	2·1	5	2·6	4	⁵⁵ S.E. by S.	3·6	⁸ N.E. by N.	4·1		
29° - 30° W.	205	3·7	20	3·5	67	3·9	3	4·5	1	1·0	7	3·0	2	³⁶ S.E. by S.	3·8	¹⁸ S.S.E.	4·4		

* In recording the Strongest Wind in a Strip, weight has been given to the number of observations ; otherwise the direction and force of a single squall would frequently appear in this column.

By comparing the means of the percentages in the *lateral* strips (Table 1) with those for October, the following results are obtained for the whole square:—

N.Ely. wind	22%	and increased	8%	since October.
S.Ely. "	58 "	"	6 "	"
S.Wly. "	7 "	and decreased	12 "	"
N.Wly. "	2 "	"	1 "	"
Variables	5 "	and not changed	"	"
Calms	6 "	and decreased	1 "	"

Hence Ely. winds have decidedly increased in amount, whilst the greatest decrease has been in S.Wly. winds. On comparing the percentages in the various lateral strips, it is shown that the greatest increase of N.Ely. winds has been in the Nn. half of the square, amounting to 21% between 6° and 7° N. The greatest increase of S.Ely. winds has been between 3° and 5° N., amounting to 21% between 3° and 4° N. The greatest decrease in S.Wly. winds has been between 3° and 7° N., where it averages 22%. Calms have increased 7% between 4° and 5° N., and decreased 8% between 7° and 8° N.

The increase in the amount of N.Ely. and S.Ely. and decrease in S.Wly. winds seem to be related to the change in position of the lowest pressure which is now on the Wn. side of the square.

The Mean of the mean forces of all winds in the 10 strips of Table 1 is 3·2, showing a slight increase since October, but this may be said to be entirely due to the increase of force in N.Ely. winds, which amounts to 1·0 of Beaufort's scale between 9° and 10° N. The force of S.Ely. and S.Wly. winds has generally decreased, though that of the very small percentage of S.Wly. winds which lie between 0° and 4° N. has increased. The greatest decrease in the mean force of all winds is 0·4, it lies between 4° and 5° N., the greatest increase (0·8) is between 9° and 10° N. The least mean force in the whole square (2·3) lies between 5° and 6° N., and it only amounts to 2·4 between 6° and 8° N. The mean amount of calm has decreased since October, its largest percentage (11) lies between 4° and 6° N.

Table 2 and the En. and Wn. strips of the chart show that all winds are weaker in force, and that there is more N.Wly. and S.Wly. wind and Calm on the En. than on the Wn. side of the square.

TABLE 3.

Latitude.	s.-s.	Winds, Force 7 or upwards, but not Squalls.	Direction of Squalls and Heavy Squalls. (All Squalls Force 7 or upwards are considered to be heavy.) (All Squalls on either side of N., S., E., or W., are given to their respective quarters, so that there are fewer from the above-named points than from the quarters.)								s.-s.	REMARKS. NOTE. A bar, thus —, separates the Remarks of different Logs. The dates of Trade limits are in the order of the sub-squares in which they occurred, beginning with the most En. one.			
			N.	N.E.	E.	S.E.	S.	S.W.	W.	N.W.					
			Heavy.	Heavy.	Heavy.	Heavy.	Heavy.	Heavy.	Heavy.	Heavy.					
9° to 10° N.	92	N.E. 7 (2 entries).	—	—	—	—	2	—	—	—	—	—	91	Sn. limit of N.E. Trade on 3rd.	
	96	N.N.E. 7	—	—	—	—	—	—	—	—	—	—	90	Squalls rising mostly from S.E., and working to the N.W., then rising again and settling in S.	
	97	" 7	—	—	—	—	—	—	—	—	—	—	91	Very heavy squall, with extremely heavy t., l., and r.	
			—	—	—	—	—	—	—	—	—	—	92	Puffy.	
			—	—	—	—	—	—	—	—	—	—	96	Very heavy squall; forced to let everything run.—Hard squalls from E.by S., force 7, 2nd reefs in topsails.	
8° - 9° N.	82	N.E. 7	—	—	1	2	—	1	1	2	—	—	—	81-89	Sn. limit N.E. Trade, 8th, 9th, 5th, 10th, 6th, 23rd.
	84	N.by E. 7	—	—	—	—	—	—	—	—	—	—	—	83	Sudden shifts of wind from S.E. to S.W. with heavy r.—Squalls from N.N.E. to E. by S., force 6.
	85	N. by E. 7	—	—	—	—	—	—	—	—	—	—	—	85	Heavy squalls, with heavy t., l., and very heavy r.
	87	N.E. 7	—	—	—	—	—	—	—	—	—	—	—	87	Wind variable, being sometimes very hot, at others, very cold.
7° - 8° N.	73	N. 7	2	—	3	6	—	—	3	5	1	—	1	71-76	Sn. limit of N.E. Trade, 23rd (3 entries), 7th.
			—	—	—	—	—	—	—	—	—	—	—	70 & 71	Nn. limit of S.E. Trade, 2nd and 23rd.
			—	—	—	—	—	—	—	—	—	—	—	70	Wind veered suddenly from N.E. to S.W.
			—	—	—	—	—	—	—	—	—	—	—	71	Sailed out of S.E. into N.E. Trade, without calm. — Squalls variable from E. round S. to W.
			—	—	—	—	—	—	—	—	—	—	—	73	Strong breeze from N., force 7, squally. —6 a.m., very heavy E.N.E. squall lasting half an hour.
			—	—	—	—	—	—	—	—	—	—	—	75	Wind came from S.E., and soon backed to N.E. (2 entries).
			—	—	—	—	—	—	—	—	—	—	—	77	A very heavy squall from S.E., force 9, lasted an hour, then calm.
			—	—	—	—	—	—	—	—	—	—	—	79	Wind veering and hauling between S.by E. and E. by N., often dying away for an hour or so.—Squalls rise in S.E., but draw to the S.Wd.
6° - 7° N.	60	N.E. 7	1	—	4	4	—	—	3	5	2	—	—	61-66	Sn. limit of N.E. Trade on 8th, 20th, 26th.
	68	S.E. by E. 7	—	—	—	—	—	—	—	—	—	—	—	60	Strong gusts from N.E., with heavy r.
			—	—	—	—	—	—	—	—	—	—	—	61	8th. Got N.E. Trade, without calm between the Trades.
			—	—	—	—	—	—	—	—	—	—	—	62	Torrents of r. with awful t. and streams of chain l., the wind coming from S.S.E. to N.N.W. round by the E.
			—	—	—	—	—	—	—	—	—	—	—	64	Squalls from N. to S., force 6, with l., t., and heavy r. Squalls from E.N.E. to S. force 6. (2 entries.)
			—	—	—	—	—	—	—	—	—	—	—	65	Wind very unsteady, flying from N.E. to S.E.—Gusts. A very heavy squall with extremely heavy r.
			—	—	—	—	—	—	—	—	—	—	—	67	Squalls from N.N.E., force 8, with l. Hard S.S.E. squalls, almost the strength of a gale.
			—	—	—	—	—	—	—	—	—	—	—	68	Split the maintopsail in a squall (? S.E.) after which wind flew to N.E., 7 to 9, for about an hour.

TABLE 3—continued.

Latitude.	s.-s.	Winds, Force 7 or upwards, but not Squalls.	Direction of Squalls and Heavy Squalls.										s.-s.	REMARKS. NOTE. A bar, thus —, separates the Remarks of different Logs. The dates of Trade limits are in the order of the sub-squares in which they occurred, beginning with the most En. one.						
			(All Squalls Force 7 or upwards are considered to be heavy.) (All Squalls on either side of N., S., E., or W., are given to their re- spective quarters, so that there are fewer from the above-named points than from the quarters.)																	
			N. Heavy.	N.E. Heavy.	E. Heavy.	S.E. Heavy.	S. Heavy.	S.W. Heavy.	W. Heavy.	N.W. Heavy.										
5° to 6° N.	55	S.S.E. 7 S. by E. 7	-	-	4	I	-	I	4	3	I	-	I	-	-	-	-	-	53-57	Nn. limit of S.E. Trade on 2nd, 25th, and 12th. 53 A sudden heavy q. from Ed., attended in latter part with torrents of rain. 54 Doldrums (6 entries). 55 Wind flew from W. to E. and blew strong. — The most listless dead- looking sky; not a breath of wind. 57 A whirlwind passed over the ship, but not of very great force. It was suc- ceeded by a few minutes calm, and then a fresh breeze. Wind recorded at the time N.E. to S.E., force 4.— Wind veering and hauling between N. by W. and S.W. by S. every few minutes. 58 Squalls, force 7, direction variable. 59 S.E. wind, very puffy.
4° - 5° N.	45	S.E. 7	-	-	4	-	-	-	4	I	I	I	-	-	-	-	-	-	40-48	Nn. limit of S.E. Trade, on 17th, 14th, 18th, 27th, 9th, 23rd, 15th, 9th. 43 Wind flying from S.W. by S. to S.S.E., with calms at intervals.—A heavy squall from S., taking the ship flat aback, torrents of rain at the end; wind decreased as rain increased. 44 Puffs from Nd. The whole day an appearance of a fresh breeze very near the ship. Clouds scarcely clear of the mastheads, with rapid motion from the Ed.; the ripple breaking against the ship's sides, but she driving helplessly to the N.W. in a calm. 47 Wind at times S.E. by S. in the squalls, and S. by W. when they are past.— Tacked at all hours between midnight and 8 a.m., but to no purpose; 10 minutes after tacking to the Wd., the wind comes from S. by W., and we cannot go better than E. on the other tack. 48 A bitter squall from E. by S., lasting about 20 minutes. — Wind very variable, ship caught aback several times during the forenoon, tacked twice, but broke off on each tack.
3° - 4° N.	—	—	-	-	-	-	-	-	4	I	-	-	-	-	-	-	-	-	32-38	Nn. limit of S.E. Trade, 5th, 16th, 26th, 24th, 7th, 27th, 3rd, 30th, 6th. 32 Wind flaws occasionally to the N.Ed. 37 Wind for a short time from N. with heavy r., then flew to S.E. by S., afterwards variable.—Shift of wind from S.E. to N.E., with rain. 39 Squalls rise from N.E., S.E., and S.W., with very heavy r.; general wind, S.Ely.

TABLE 3—continued.

Latitude.	s.-s.	Winds, Force 7 or upwards, but not Squalls.	Direction of Squalls and Heavy Squalls. (All Squalls Force 7 or upwards are considered to be heavy.) (All Squalls on either side of N., S., E., or W., are given to their re- spective quarters, so that there are fewer from the above-named points than from the quarters.)										s.-s.	REMARKS. NOTE. A bar, thus —, separates the Remarks of different Logs. The dates of Trade limits are in the order the sub-squares in which they occurred, beginning with the most En. one.			
			N.	N.E.	E.	S.E.	S.	S.W.	W.	N.W.							
			Heavy.	Heavy.	Heavy.	Heavy.	Heavy.	Heavy.	Heavy.	Heavy.							
2° to 3° N.	—	—	-	-	1	-	-	-	-	-	1	-	-	-	-	23 & 25 24	Nn. limit of S.E. Trade on 22nd and 12th. We have crossed the variables without once tacking, merely bracing up on port tack. Ship going south.
																28	Wind veering from S.E. by S. to S. by W. as we tack. Tacked 6 or 8 times in 6 hours on the 14th, and could never once go better than E. or W., for more than 5 minutes after tacking. So long as we do not tack wind does not vary ¼ point. For 16 hours sailing 8 knots, only made 16 miles of southing.
1° - 2° N.	13	S.S.E. 7	-	-	-	-	-	-	-	-	-	-	-	-	-	12 16	A very heavy squall, with heavy r. Wind variable from N. through E. to S. with calm intervals.
0° - 1° N.	—	—	-	-	-	-	-	1	-	-	-	-	-	-	-	09	Heavy squalls from S.S.E.
Sum	-	16, of which 10 are N.Ely.	3	-	17	13	-	2	19	20	5	1	3	1	-	-	

NOTE.—The strong N.E. winds and squalls from the same direction have increased greatly since October. S.Ely. squalls continue very nearly the same in number, and are still the most prevalent. The greatest decrease has been in the S.Wly., Wly., and N.Wly. squalls. The hot and cold wind remarked on in s.-s. 87, may be caused by the inrush of heated air from Africa. (See the isobars on the Diagram for this month.)

Since October, the number of strong winds, force 7, has decreased by one, but there are now several more from N.E. than from S.E., showing how the former is gaining and the latter losing force in the square. The direction of 84 squalls has been recorded, which is one less than the number in October.

CURRENTS.

TABLE 4.—LATERAL STRIPS.

Lateral Strips. 10° of Longitude by 1° of Latitude.	No. of Observa- tions.	Mean Rate.	N. to E. by N. or N.Ely.		E. to S. by E. or S.Ely.		S. to W. by S. or S.Wly.		W. to N. by W. or N.Wly.		None.	Prevailing Current.		Strongest Current.*		
			%	Mean Rate.	%	Mean Rate.	%	Mean Rate.	%	Mean Rate.		%	No. of Observations. Direction.	Mean Rate.	Direction.	Rate.
9° to 10° N.	39	11	10	10	31	13	15	20	18	16	26	S.S.E. ⁴	12	S.W. by S.	33	
8° - 9° N.	31	10	19	17	23	12	10	17	16	14	32	E. ³	16	E. by N.	36	
7° - 8° N.	53	12	13	19	25	18	17	17	15	14	30	E. ⁵	22	E. by N.	51	
6° - 7° N.	64	14	16	15	31	20	17	14	14	19	22	S.E. ⁵ by E.	19	S.E.	56	
5° - 6° N.	50	11	18	22	20	13	16	13	14	17	32	N.E. ⁴	24	N. by W.	36	
4° - 5° N.	53	12	26	18	17	17	11	12	21	16	25	N.E. ³	19	W. by N.	37	
3° - 4° N.	63	14	14	14	5	10	24	13	46	17	11	W. ⁹	15	W. by S.	40	
2° - 3° N.	58	18	4	27	4	14	22	22	60	19	10	W.N.W. ¹⁰	25	S.W.	48	
1° - 2° N.	54	17	—	—	4	12	15	17	70	20	11	W. ¹³	20	W.	36	
0° - 1° N.	36	15	11	16	6	10	30	16	42	19	11	W.N.W. ⁵	20	W. by S.	35	

TABLE 5.—VERTICAL STRIPS.

Vertical Strips. 10° of Latitude by 1° of Longitude.	No. of Observa- tions.	Mean Rate.	N. to E. by N. or N.Ely.		E. to S. by E. or S.Ely.		S. to W. by S. or S.Wly.		W. to N. by W. or N.Wly.		None.	Prevailing Current.		Strongest Current.*		
			%	Mean Rate.	%	Mean Rate.	%	Mean Rate.	%	Mean Rate.		%	No. of Observations. Direction.	Mean Rate.	Direction.	Rate.
20° to 21° W.	29	11	21	14	17	12	7	11	31	16	24	N.W. ²	21	N.W. by W.	28	
21° - 22° W.	38	12	19	15	26	13	16	15	21	15	18	E. ⁵	15	W.S.W.	25	
22° - 23° W.	30	13	3	24	13	15	17	18	40	18	27	W.N.W. ⁴	25	W. by S.	35	
23° - 24° W.	49	11	12	16	18	18	10	16	27	14	33	W.N.W. ⁴	15	E. by S.	32	
24° - 25° W.	62	16	10	26	31	20	19	13	26	19	14	W. ⁶	22	S.E.	56	
25° - 26° W.	77	13	14	16	18	15	16	18	29	18	23	W. by N. ⁵	27	E.S.E.	41	
26° - 27° W.	73	14	15	13	16	12	18	14	37	21	14	W. ⁹	18	W.N.W.	41	
27° - 28° W.	52	14	12	20	2	8	31	18	34	17	21	W.S.W. ⁶	19	S.W.	48	
28° - 29° W.	63	15	13	21	6	15	22	18	41	18	18	N.W. ⁶ by W.	16	N.W. by W.	37	
29° - 30° W.	28	14	11	16	7	13	18	16	46	19	18	W.N.W. ³	30	W.N.W.	40	

*The Strongest Current in each Strip is here given, as it is important to the Navigator to know the extreme to which he is liable.

Table 4 shows that Wly. currents prevail from the Equator to 4° N., and that their percentage has greatly increased since October, especially that of N.Wly. Ely. currents prevail from 4° to 10° N., but their percentage has decreased very decidedly since October. The percentages of Wly. and No Current have increased in the Nn. part of the square, whilst the percentage of No Current has greatly decreased between 1° and 5° N.

By referring to the Diagram in the lower right-hand corner of the Chart, it will be seen how much more Sly. the prevailing Ely. current has become since October, and S.Wly. currents show in the Nn. part of the square, indicating the effect of the N.Ely. wind in breaking up the Ely. current. The Wly. current due to the N.E. Trade will be found to have established itself in the Nn. part of the square in December.

The sea isotherms still show a decrease in the temperature of the Wly. current as you pass from 4° N. to the Equator, but the change is not so great. They also show that the temperature of the Ely. current is still very uniform, though its greatest heat remains in the N.En. corner of the square, and the shape of the isotherms leads to the opinion that the temperature of the surface water is affected by the inrush of heated air into its N.En. corner as seemed to be the case in October.

Current rips were most frequently seen between 8° and 10° N. where there were 15 of the 34 entries. The Diagrams show that in this part of the square a Nly. is displacing a Sly. wind, and a Wly. an Ely. current, so that the large amount of ripple seems to be accounted for. The next largest number of ripple observations (5) lies between 5° and 6° N., near where the Ely. and Wly. currents seem to meet. The remarks on currents support the fact that Wly. currents are more common in the Nn. half of the square than in previous months. They also frequently mention that "No Current" was experienced there.

The following remarks seem worthy of extraction :—

Latitude.	Sub-square.	Remarks on Currents.
9° to 10° N.	92	Strong current ripples as far as can be seen.
8° - 9° N.	84	Very light tide rips; yesterday they were in regular parallel belts with very short intervals of smooth water between them, but to-day and previous to yesterday they were about $\frac{1}{2}$ to 1 hour apart. (Ship from N., wind E.N.E. 3.)
0° - 1° N.	09	8th. Sighted St. Paul's Rocks; there was a strong Wly. current, as we made the rocks on the lee bow and expected to weather them, but we drifted fast to leeward of them. (Wind S.E., ship bound to the Sd.)

SEA.

The sea was remarked on as "luminous" 35 times in November, of these, 19 were in the Nn. and 16 in the Sn. half of the square, the largest number in any one strip was 6: it occurred between 6° and 7° N., and again between 2° and 3° N. It was "very

luminous " three of the times between 6° and 7° N. In comparing observations of which the percentages are not given, it will be well to consider how many wind observations have been taken in each strip; for instance, Table 1 shows that the wind was very light, and there were 535 observations between 6° and 7° N., whilst there were only 353 between 2° and 3° N., so that six observations in the latter strip have more relative value than six in the former.

The sea was "deep blue" 16 times, of these three were between 1° and 2° N.; it was "green" seven times, these were pretty equally distributed.

Latitude.	Sub-square.	Remarks on Sea. NOTE. A bar, thus —, separates the Remarks from different Logs.
9° to 10° N.	98	10 p.m., sea very luminous, this hour only.
8° — 9° N.	85	Water very luminous with millions of <i>Diphydes</i> , <i>Bonitos</i> filling the sea with fiery streaks by rushing to and fro.
7° — 8° N.	76	Specific gravity: surface 1·0277; temp. 81°·5. " " 16 feet 1·0282; " 82.
5° — 6° N.	54	Surface of the sea with a slimy look.
2° — 3° N.	58	Much phosphorescent matter in large masses, too deep to be fished up in a bucket.
	27	Ship passed constantly through bright lines of phosphorescent <i>Medusæ</i> extending as far as eye could reach in a N.W. and S.E. direction. Before reaching the lines they looked like broken water.
0° — 1° N.	04	Large balls of phosphoric light in the sea.
	08	The colour of sea changed from dark blue to glaucous green.
Sea Temperature.		
9° — 10° N.	95	23rd, 1839. Capt. Crozier, H.M.S. "Terror," sent down Marret's bottle. Line out - - - - - 400 fathoms. Depth shown by Massey's lead - - - 378 " Temperature of surface water - - - 81·5 " " water in bottle from 100 fms. - 66·7 Six's thermometer, No. 364, attached at 378 fms. 79·5 and 49°. " " " 365, " 81·5 and 49°. Specific gravity of surface - - - 1·0283 (only corrected for temperature). " " at 100 fms. - 1·0275 "
7° — 8° N.	75	24th, 1839. Capt. Crozier, H.M.S. "Terror," sent down Marret's bottle. " Line out - - - - - 340 fathoms. Depth shown by Massey's patent lead - - 220 " Temperature of surface water - - - 81·5 " " water in bottle from 220 fms. - 64·2 Six's thermometer, No. 364 - - - 81 and 48°. " " " 365 - - - 77 and 55°. Specific gravity of surface - - - 1·0273 (only corrected for temperature). " " water from 220 fms. - 1·0271 "
6° — 7° N.	65	25th, 1839. Capt. Crozier sent down Marret's bottle. " Line out - - - - - 350 fathoms. Depth shown by Massey's patent lead - - 250 " Temperature of surface water - - - 81·8 " " water from 250 fathoms - 67·5 Six's thermometer, No. 364 - - - 83 and 43°. " " " 365 - - - 80·8 and 49°. Specific gravity of surface - - - 1·0267 (only corrected for temperature). " " water from 250 fathoms 1·0272 " " "

Latitude.	Sub-square.	Remarks on Sea. NOTE. A bar, thus —, separates the Remarks from different Logs.
5° to 6° N.	58	Sea temperature at surface - 81 " " 1 fathom - 80·5 " " 3 fathoms - 80·3 " " 5 " - 80
4° — 5° N.	46	28th, 1839. Capt. Crozier put over Massey's lead with Six's thermometers. Line out - - - - - 300 fathoms. Depth shown by lead - - - - - 230 " Temperature of surface - - - - - 80 Six's thermometer, No. 364, at 230 fathoms - 78 and 47 " " " 365, " " - 80·8 " 49·2 " " " 364, 112 " - 79 " 53 " " " 365, " " - 78·5 " 58

The En. and Wn. strips of the published Chart show that between 8° and 10° N. in November, swells or seas from some Nn. quarter prevail over all others, whilst those from some Sn. quarter prevail in the rest of the square. There is, however, a larger percentage of swells from some Nn. quarter, and smaller of those from some Sn. quarter, on the En. than on the Wn. side of the square; this difference is very decidedly shown in each strip, and is contrary to the experience of previous months. Confused seas are most frequent between 4° and 6° N. where the currents meet, and smooth seas between 0° and 2° N., where the S.Ely. wind and Wly. current have been steady.

CLOUDS.

Tables 6, 7, and 8, with the remarks on Clouds, are compiled from the data for 1° sub-squares.

TABLE 6.—LATERAL STRIPS.
PERCENTAGES of each FORM, and MEAN AMOUNT of all CLOUDS.

Lateral Strips. 10° of Longitude by 1° of Latitude.	No. of Observa- tions.	Upper Clouds.			Lower Clouds.				Amount, 10 being "Com- pletely Clouded."	
		Cir.	Cir.-c.	Cir.-s.	Cum.	Cum.-s.	Str.	Nim.	No. of Obs.	Mean.
		%	%	%	%	%	%	%		
9° to 10° N. -	184	10	16	3	43	14	9	26	196	6·0
8° — 9° N. -	207	9	7	10	44	16	9	30	231	6·2
7° — 8° N. -	259	7	9	7	33	24	8	38	288	6·6
6° — 7° N. -	363	9	12	7	32	22	10	31	357	6·3
5° — 6° N. -	364	9	13	6	34	23	11	35	388	6·7
4° — 5° N. -	350	7	14	7	33	17	11	34	381	6·5
3° — 4° N. -	267	10	16	7	49	11	7	22	320	5·8
2° — 3° N. -	232	13	16	4	62	11	7	17	270	5·4
1° — 2° N. -	176	11	14	4	66	14	5	10	212	4·7
0° — 1° N. -	165	13	18	4	60	12	3	7	188	4·3

TABLE 7.—VERTICAL STRIPS.

PERCENTAGES of each FORM, and MEAN AMOUNT of all CLOUDS.

Vertical Strips. 10° of Latitude by 1° of Longitude.	No. of Observa- tions.	Upper Clouds.			Lower Clouds.				Amount, 10 being "Com- pletely Clouded."	
		Cir.	Cir.-e.	Cir.-s.	Cum.	Cum.-s.	Str.	Nim.		
		%	%	%	%	%	%	%	No. of Obs.	Mean.
20° to 21° W.	121	9	12	11	43	25	2	27	146	5.7
21° - 22° W.	188	3	13	5	39	31	10	20	210	5.8
22° - 23° W.	187	17	16	6	41	18	5	22	206	5.7
23° - 24° W.	315	10	11	6	38	13	3	36	335	6.4
24° - 25° W.	402	9	12	7	43	19	7	32	456	5.9
25° - 26° W.	381	11	14	8	37	18	8	31	390	6.2
26° - 27° W.	344	8	15	6	48	12	10	23	360	5.7
27° - 28° W.	242	8	15	5	48	14	15	20	281	6.2
28° - 29° W.	259	8	12	5	45	16	13	26	285	6.1
29° - 30° W.	128	11	16	5	55	12	6	22	162	6.0

The mean of the means in the strips of Table 6 shows that the Mean Amount of Cloud for the whole square is 5.9 or 0.3 more than in October. By comparing the means for each strip, it is shown that the greatest increase since October lies between 7° and 10° N., and the remainder between 0° and 3° N.; between 3° and 7° N. it has slightly decreased. This increase in the Amount of Cloud in the Nn. part of the square seems remarkable; it is well borne out by the remarks on clouds which follow. They also speak of much heavy cloud in the Sn. part of the square.

The mean of the percentages of Nimbus in the 10 strips (25%) shows an increase of 2% since October; this increase is pretty evenly spread throughout the various strips.

The largest percentage of Nimbus (38%) lies between 7° and 8° N., it averages nearly 35% between 4° and 8° N., where there is the largest Amount of Cloud, averaging 6.5.

The largest percentages of Nimbus and rain, together with the least mean force of all winds agree in placing the Doldrum between 5° and 8° N. in November.

Table 7 shows the largest percentage of Nimbus between 23° and 24° W., where there is also the largest percentage of rain and Amount of Cloud. The percentage of Nimbus has very decidedly increased on the En., and decreased on the Wn. side of the square since October.

TABLE 8.

The following Table is derived from the Remarks on Clouds in November:—

NOTE.—All cloud entries from N. to E. b. N. inclusive have been given to the N.En. quarter.
" E. b. S. to S. " S.En. "
" S. b. W. to W. b. S. " S.Wn. "
" W. b. N. to N. b. W. " N.Wn. "

Upper clouds from E. or W. have been extracted in the Remarks. Lower clouds flying with the wind have not been recorded.

Quarters from which the Clouds and Wind came.		Lower Clouds.			Clouds (doubtful whether upper or lower).			Upper Clouds.		
Clouds from.	Wind from.	Total No. of Observa- tions.	No. in Nn. Half of Square.	No. in Sn. Half of Square.	Total No. of Observa- tions.	No. in Nn. Half of Square.	No. in Sn. Half of Square.	Total No. of Observa- tions.	No. in Nn. Half of Square.	No. in Sn. Half of Square.
N.En.	N.En.	—	—	—	—	—	—	3	3	—
"	S.En.	—	—	—	20	7	13	7	1	6
"	S.Wn.	—	—	—	3	3	—	1	—	1
"	N.Wn.	—	—	—	1	1	—	—	—	—
"	S.	—	—	—	4	3	1	1	—	1
"	E.	—	—	—	—	—	—	2	1	1
		3	2	1	11	11	—	47	25	22
S.En.	N.En.	1	1	—	9	9	—	13	11	2
"	S.En.	—	—	—	—	—	—	24	5	19
"	S.Wn.	1	—	1	—	—	—	1	—	1
"	N.Wn.	—	—	—	—	—	—	2	2	—
"	N.	1	1	—	1	1	—	—	—	—
"	E.	—	—	—	1	1	—	7	7	—
		3	2	1	11	11	—	47	25	22
S.Wn.	N.En.	—	—	—	4	4	—	6	6	—
"	S.En.	—	—	—	4	—	4	16	6	10
"	S.Wn.	—	—	—	—	—	—	1	1	—
"	N.Wn.	—	—	—	—	—	—	1	1	—
"	E.	—	—	—	2	2	—	—	—	—
		—	—	—	10	6	4	24	14	10
N.Wn.	N.En.	—	—	—	1	1	—	1	1	—
"	S.En.	—	—	—	5	—	5	8	—	8
"	S.Wn.	—	—	—	—	—	—	1	—	1
		—	—	—	6	1	5	10	1	9

NOTE.—The following are the percentages of upper clouds from various quarters, 95 being the total number of observations:—

From the N.En. quarter 15% being — 17% since October.
" S.En. " 49% " + 6% "
" S.Wn. " 25% " + 9% "
" N.Wn. " 11% " + 2% "

There have been fewer observations of the motion of upper clouds by 64 in November than in October, of which reduction 36 were in the Nn. and 28 in the Sn. half of the square. In the Northern half of the square the largest number of upper clouds from any one quarter with any one wind was 11 from S.E., wind N.Ely., whilst in the Sn. half of the square there were 19 from S.E., wind S.Ely.; in this latter case the motion of upper clouds seemed to be generally more from the Ed. than the wind.

The above percentages show that the proportion of upper clouds from N.E. has greatly decreased, whilst that of those from S.W. and S.E. has increased. It will be noticed that there is a large number of Clouds (doubtful whether upper or lower) from N.E., wind S.E. and they are chiefly in the Sn. half of the square.

The following remarks on Clouds have been extracted from the logs:—

Latitude.	Sub-square.	Remarks on Clouds. NOTE. A bar, thus —, separates the Remarks from different Logs.
9° to 10° N.	91	Cir.-s. from N.N.E., wind variable.
	93	Upper clouds from W.S.W., middle stratum from E.N.E., wind N.N.E.—Cir. coming steadily from S., wind Easterly.
	95	Heavy nim. lying in strata on the N.En. horizon.
	96	Upper clouds from S. b. W., scud very fast from S.E. b. S. over the sun, wind E. b. N.—Clouds from S. b. E., wind S.E. b. E.
	99	Cir. from E., wind E.N.E.
8° - 9° N.	82	Clouds strong from E.N.E., wind N.N.E.
	83	Clouds from W.N.W., no wind.*
	85	Heavy clouds from S.S.W., wind E.N.E.—Scud fast from S. by E., wind N.E.—Clouds from E. by N., no wind.—Cir.-s. from S.W. by S.; patches of nim. from all directions, no wind.
	86	Very heavy cum. all round.—Huge masses of cloud stretching across the sky from E. to W.
	87	The sky, to a height of 20° above the horizon, obscured with masses of leaden-hued clouds, wind N.
7° - 9° N.	89	Cir. from E., wind N.E. by E. (2 entries).
	70	Cir.-c. from E.N.E., lower clouds from N.N.W., wind N.Ely.
	72	Upper clouds from E., wind E.N.E.—Clouds from N.E. b. N., no wind.
	73	Clouds travelling very slowly from the Ed., wind N.Ely.
	74	Clouds massed in heavy strata on horizon, wind E.—Clouds on En. horizon at a low altitude, and moving rapidly from the S.Ed., wind N.E.
	75	A dense leaden stratum of clouds all over, wind N.E. b. N. 5.
	76	Sullen looking heavy clouds piled up about horizon.—Clouds thick and packed.
	77	Cir.-s. from S. b. E., no wind.
	78	Cir. from S.E. by E., wind variable N.Wly.—Cir.-c. from S., no wind.
	79	A heavy bank of dark clouds resting on horizon from S.W. by S. to S.E. by E., sheet l. there also.—Cir. from E., wind N.E. b. E.
6° - 7° N.	61	Cir.-c. from E., wind E.S.E.
	63	Clouds from N.E. b. N., no wind.—Cir. from W.S.W. and S.S.E., wind very unsteady, shifting from N.E. to W. b. S. and back to N.E.; much l. to the Nd.
	64	A thin veil of str. all over sky with very large white-topped stack-clouds round the horizon.—Dense black nimbi rising continually in the E. filled with rain. Sky covered with leaden-coloured clouds, dark masses of nim. continually rising in E. and N.E.
	65	Clouds coming rapidly from S.E. b. E., wind N.E. 2.—Clouds apparently crossing each other from N.W. and S.E., no wind. Cir.-c. changing quickly to cum.-s.
	66	Clouds from N.E. b. N., no wind.
	68	Clouds slowly from S.E., wind S.W. 1 to 0.
	69	Several strata of clouds from different directions, one of cir.-c. from N. b. W., another a little higher from E. b. N., lower clouds from S.E., wind E. b. S.; in the Sn. quarter it is very dark, with sheet l.
	53	Upper clouds from N.E., cir.-s. from S.E., no wind.—Black watery clouds stationary on horizon all round; wind Sly. 2.
	54	Dense masses of clouds on horizon all round.—Clouds from various directions.
	55	Clouds from various directions, wind Ely. (two entries).—Cir.-s. from S.E., no wind. Cir.-s. from W., no wind.

* No wind, means that it was calm at the time.

Latitude.	Sub-square.	Remarks on Clouds. NOTE. A bar, thus —, separates the Remarks from different Logs.
5° to 6° N. <i>continued.</i>	56	Cir.-s. from S.E., no wind.*—Clouds drifting fast over the moon, and changing their direction very frequently, wind S. by E.
	57	Cir. from S.E., no wind.
	58	Heavy black clouds driving in every direction.
4° - 5° N.	41	Three strata of clouds distinctly visible, viz., cir.-c. motionless and evaporating, cir.-c. or rather small cum. from E.S.E., cir.-s. and nim. from S.E. b. S.; wind S.E. b. S.
	42	Cir.-s. from E., wind E.
	44	6 p.m. Huge cum. in N.N.W. with rainbow on it, wind S.S.E.—Clouds from E.S.E. no wind.—Upper clouds from E.S.E., wind variable.
	45	Clouds from various directions, wind S.E.—Clouds of a very dull leaden appearance, what little motion they have had the last two days has been from E. and E.S.E., while what little air of wind we have had, has been from S. (Ship bound to the Sd.)
	46	Cum. from E., wind S.E. b. S.
	47	Cir. swiftly from N.E., wind S.E. b. S.—Clouds moving in various directions.—Lower clouds from E.S.E., no wind.—Clouds from N.E. b. N., wind variable.
	49	Clouds from different directions, wind W.N.W.
3° - 4° N.	33	Clouds very slowly from Sd.; heavy masses of cum. in horizon, wind S.E. 3.—Clouds piled up on horizon all round and stationary.
	34	Clouds rising fast from Sd. and falling over to W.N.W., no wind.—Cir.-c. from Wd., wind S.E. b. S.—Clouds from E., wind S.Ely. Cir. from E., wind S.S.E.—Nim. in N.E. as heavy as in the rainy regions, wind S.E. 3. When we see an upper stratum of clouds it is quite still and dead-like; wind S.E. 3.
	35	Cir.-s. from N.W. b. W.
	38	A heavy nim. came from the Ed. with heavy r. for a short time.—Dense heavy nim. in E. b. S., wind S. by E.—Heavy masses of cloud passing over with sprinklings of rain.
2° - 3° N.	22	Dense bank of black clouds in N.E., wind E. b. S.
	23	Dense cum. and nim. in En. horizon.—Cir.-s. from E., wind S.E.
	24	Str. from N.N.E., cum. and nim. from S.S.E., wind S.
	25	Cir. from E., wind S.E. b. E.
	26	Misty cum. passing rapidly from E.N.E., wind S.S.E. 3. 6th. The more motion the clouds have from E.N.E. the more the wind draws to S.; the said clouds are the lower stratum, and not very much higher than the mastheads.
	27	Heavy cum. rising occasionally in the N.E., wind S.E. b. S.—Lower clouds from S.E. b. E., wind S.S.E.
1° - 2° N.	10	Clouds coming strongly from E.N.E., wind E.S.E. 5.—Clouds from Ed., wind Sly.
	13	Clouds very slowly from N.W. b. W., wind S.Ely. 4. (three entries).
	16	Clouds from S.E. b. E., no wind.
	17	Heavy banks of cum.-s. round the N.Wn. horizon. Clouds from various directions, wind S.E.
	18	Clouds from S., wind S.E.
0° - 1° N.	00	Clouds from N.N.W. and E.N.E., wind S.E.
	01	Clouds from N., wind S.E.—Cir.-c. from E., wind S.S.E.
	02	Lower clouds with great rapidity from S.E. b. S., wind S. b. E. 5.
	03	Cir.-c. slowly from N.W., wind S.E. 3 (two entries).
	08	Cir. from S., wind S.E. b. E. 5.—Clouds changing very much, long strips of cir. from N.W. b. W. being blown back, then settling down to N.E., wind S.E.
	09	Cum. rising fast from S.W. b. S., wind S.E. b. S.

* No wind, means that it was calm at the time.

WEATHER.

TABLE 9.—LATERAL STRIPS.

Lateral Strips, being 10° of Longitude by 1° of Latitude.	Thunder. (t.) %	Lightning. (l.) %	Squalls. (q.) %	Rain. (r.) %	Mist or Haze. (m.) %	Dew. (w.) %
9° to 10° N. - - -	5	20	16	14	11	-
8° - 9° N. - - -	4	15	18	21	10	-
7° - 8° N. - - -	9	23	21	28	5	$\frac{1}{4}$
6° - 7° N. - - -	4	14	21	27	4	-
5° - 6° N. - - -	3	10	17	25	3	-
4° - 5° N. - - -	1	6	16	26	5	-
3° - 4° N. - - -	$\frac{1}{2}$	3	10	16	4	$\frac{1}{4}$
2° - 3° N. - - -	-	$\frac{3}{4}$	8	8	4	2
1° - 2° N. - - -	-	2	6	4	4	3
0° - 1° N. - - -	-	$\frac{1}{2}$	4	3	8	3

TABLE 10.—VERTICAL STRIPS.

Vertical Strips, being 10° of Latitude by 1° of Longitude.	Thunder. (t.) %	Lightning. (l.) %	Squalls. (q.) %	Rain. (r.) %	Mist or Haze. (m.) %	Dew. (w.) %
20° to 21° W. - - -	7	13	13	18	3	3
21° - 22° W. - - -	3	10	9	18	4	1
22° - 23° W. - - -	3	12	12	13	3	$\frac{3}{4}$
23° - 24° W. - - -	3	10	12	26	7	$\frac{4}{8}$
24° - 25° W. - - -	3	9	16	22	6	$\frac{1}{6}$
25° - 26° W. - - -	5	13	16	17	4	$\frac{1}{2}$
26° - 27° W. - - -	2	9	15	18	7	$\frac{1}{5}$
27° - 28° W. - - -	1	7	16	18	4	$\frac{2}{4}$
28° - 29° W. - - -	$\frac{3}{4}$	6	18	17	9	$\frac{1}{4}$
29° - 30° W. - - -	2	6	14	18	7	$\frac{1}{2}$

TABLE 11.—LIGHTNING.

This Table gives the bearing on which Lightning was seen in the various Lateral Strips. Only the bearings recorded as actually N., S., E., or W. have been given to those points.

Lateral Strips, being 10° of Longitude by 1° of Latitude.	Number of Observations.	Bearing										All round	No direction given.
		N.	N.Ely.	E.	S.Ely.	S.	S.Wly.	W.	N.Wly.				
9° to 10° N. - - -	31	1	2	-	8	6	7	-	1	3			
8° - 9° N. - - -	26	-	3	1	5	4	6	-	1	2		3	
7° - 8° N. - - -	46	-	15	6	5	2	2	-	4	3		4	
6° - 7° N. - - -	45	5	14	5	9	1	2	-	3	3		9	
5° - 6° N. - - -	33	1	13	6	4	2	1	-	4	1		3	
4° - 5° N. - - -	14	1	5	2	1	-	2	-	2	1		1	
3° - 4° N. - - -	5	-	1	2	2	-	-	-	-	-		-	
2° - 3° N. - - -	2	-	1	1	-	-	-	-	-	-		-	
1° - 2° N. - - -	2	1	-	-	-	-	1	-	-	-		-	
0° - 1° N. - - -	1	-	1	-	-	-	-	-	-	-		-	
Total for month and how distributed -	205	9	55	23	34	15	21	-	15	13		20	

The means of the various percentages in Table 9 compared with those for October, show that unsettled weather has continued to increase.

By comparing the percentages of various strips, thunder, lightning, squalls, and rain are found to have increased most between 6° and 8° N., whilst there is the least mean force of wind for the month between 5° and 8° N. By comparing Tables 1 and 9, it will be seen that the largest percentage of lightning takes place where the percentages of N.Ely. and S.Ely. winds are nearly equal, and to the Nd. of that latitude. Squalls and rain have decreased between 9° and 10° N., and squalls again between 3° and 5° N. Between 6° and 10° N., about 1 squall in 8 was heavy. Very heavy squalls were recorded in s.-ss. 91, 96, 73, 65 and 12; they are remarked upon in Table 3. Mist has increased very decidedly between 8° and 10° N., and again to a less degree between 0° and 1° N. This increase of mist in the North seems to be related to the immense increase which is shown there in December, accompanied by red dust. The largest amount of dew is still found over the cool Wly. current between the Equator and 3° N.; and Table 10 shows that there is more on the En. than on the Wn. side of the square. Table 10 also shows a greater increase of unsettled weather in the En. than in the Wn. half of the square since October.

Table 11 compared with that for October, shows that there has again been a large increase in the number of times the bearing of lightning was observed. Between 8° and 10° N. lightning on some Sly. bearing was much the most frequent, whilst to the Sd. of 8° N. it was most frequent on some Nly. bearing. Of the 23 E. bearings, 17 were seen between 5° and 8° N.; not one W. bearing is recorded. These facts seem to show that the chief source of the lightning is the mixture of the air which has formed the two Trades, and that it is most chiefly seen in the directions from which the Trades come.

The following remarks on Weather have been extracted from the Logs, they give the direction in which various kinds of lightning were seen, &c. :-

Latitude.	Sub-square.	Remarks on Weather.
		NOTE. A bar, thus —, separates the Remarks from different Logs.
9° to 10° N.	91	Very heavy l. from every direction, and t. in the N.N.E. Very dark, vivid chain l. from all directions.
	92	Moist atmosphere.—Weather close and muggy (two entries).
	93	Large ring round the moon.—Heavy l. in the E.S.E. and S.S.W. Frequent flashes of sheet l.
	94	Close dry hazy atmosphere.—Lightning commencing in the S.E., and spreading towards the W. by the S.W., obtaining a high altitude and very vivid, it was both forked and sheet.
	95	Frequent flashes of sheet l. all round from S.E. b. S. to S.W. b. S.
8° - 9° N.	96	Very sultry (five entries).
	98	The sky overhead remarkably clear, but obscured from the horizon to 20° high.
	99	Chain and forked l. with t. and r.
	80	Fierce crimson sheet and forked l., and heavy t. in all quarters.
	81	Small sheet l. in W.S.W. (for heat).—Atmosphere more clear, and not nearly so oppressive as yesterday (ship from N.).—Quick, sharp l. to the Sd.

Latitude.	Sub-square.	Remarks on Weather. NOTE. A bar, thus —, separates the Remarks from different Logs.
8° to 9° N. <i>continued.</i>	82	Midt. to 5.30 a.m. Heavy l. from E.S.E. to W.S.W., and t. in S.W.
	83	Very hot and sultry.—A very large halo round the moon.
	84	Lightning in S.W., commencing near horizon and reaching a high altitude, with black, watery clouds.
	85	Midnight intensely dark, flashes of l. frequent and vivid.—Bright to the N., gloom with distant thunder to the S.—A ball of St. Elmo's fire playing about the royal and top-gallant yard arms.
7° - 8° N.	86	Very close and sultry (two entries). Very disagreeable damp weather.—Heavy showers, shifts of wind, dead calms, and terrific t. and l.
	88	Sheet l. in the N.E.
	70	Stifling hot.—Very heavy thunder and lightning working slowly round from S.S.E. to N.N.W.
	71	Very hot.
	73	Incessant l., flash to the S.Ed., and forked to the S.Wd. principally; distant t. in same directions.
	74	Lightning from N. b. W. to E. b. S.—Very hot and sultry.—Much chain l.—Much l. flashing in the N.E. all night.
	75	Forked l., t., and heavy r.—Chain l.—Heavy thunderstorm with chain l. passing from S.E. to N.W.
	76	7th. Beautifully bright clear blue sky all day; dry air, no signs of rain; wind N.E. b. E. 2.
	77	Much sheet l. to the Ed.—Hot, oppressive weather.
	78	Sheet l. occasionally to the N.Ed.
6° - 7° N.	61	Excessively hot and sultry.
	62	Torrents of r. with awful t. and streams of chain l.—Two waterspouts in the W., one straight, the other shaped like the letter S. They disappeared in half an hour.
	63	Sheet l., t., and r.—Flash l. in patches in En. and Nn. horizons.
	64	Dark, close, and hot.—A large waterspout to the S.Wd.—Waterspouts forming in parts. Clouds apparently down in the water.
	65	Sheet l. in N. and S.E.—Hot, suffocating weather (two entries). Rain in torrents, like the Coast tornadoes.
	66	Very sultry and oppressive.—Very fine.—A very large waterspout to the S.Ed., suspended in a N. and S. direction, containing a large body of water.
	67	Much sheet l., chiefly in S.E., E., and N.E. as far as N.—Heavy l. in the N.E. and zenith; much sheet l. in S.
	68	Heat glare.
	51	Much l. to the Nd., playing behind huge cum.
	52	Two waterspouts in S.S.W., they lasted about five minutes.
5° - 6° N.	53	A waterspout formed in the E.S.E., and lasted about 10 minutes.
	54	Moon, when seen, with halo and bur.—A little sheet l. in E.
	56	Two waterspouts in sight; also a whirlwind passed so close to the ship that the outer edge of the circle touched the mizen, but did no damage.
	57	Pale sheet l. in S.E.—A waterspout to the N.Ed., distant about 1½ miles, it was beautifully distinct; cannot say which way it gyrated, it appeared first to lean to the right, then to the left, and again to the right; it lasted nearly eight minutes, making a tremendous vapour where it touched the sea. The ship was becalmed at the time.
	58	Very sultry.—Very close, hot, and oppressive.
	42	Faint flash l. in patches near the horizon to the Nd. and Ed.—Halo round the moon.
	44	Very fine, but exceedingly warm and sultry.—The sky green, with a dirty, fishy look. Sharp chain l. to N.W. and N.E.—Close, sultry, and oppressive.
	45	Pale, weak l. in the S.E.
	46	Very close (two entries).—Very fine and very hot.—Lightning extending from N.E. to S.S.W.
4° - 5° N.		

Latitude.	Sub-square.	Remarks on Weather. NOTE. A bar, thus —, separates the Remarks from different Logs.
4° to 5° N. <i>continued.</i>	47	A large waterspout in the S.E. passing to the westward about 4 miles ahead of the ship, could not see in which way it revolved, but could distinctly see the water rushing from the sea and meeting the jet from above; apparent diameter 4 feet, apparent height of clouds from sea, 180 feet; wind Ely.: it lasted three quarters of an hour.
	48	Very hot, close, and murky, making everything mould (two entries).—The weather has a very peculiar dark leaden appearance, the clouds all round containing apparently floods of rain.
	49	Gloomy, moist, and disagreeable.
	33	Lightning near horizon in N.E., flash and faint.
3° - 4° N.	34	Very hot and sultry.—Bur round the moon.
	35	Circle round the moon.
	36	Very hot.—A lurid appearance at an altitude of 12° extending from S.E. to S.
	38	A fiery haze along the horizon.—A beautiful lunar rainbow.
2° - 3° N.	21	18th, 8 p.m. I have never before seen such heavy dew as on this night; wind S.E. 3. Air temp. 79°. (The damp bulb and temperature of sea surface were not given.)
	23	A circle round the moon, of small diameter.
	26	3rd. Very heavy rain: took 1,400 gallons of water from the poop-deck in 1½ hours. —Sun very bright, but a white glare over all.
1° - 2° N.	13	Thin haze enveloping sky.
	16	Flash l. in N.—Red and ugly-looking in the S.E., a green, fishy appearance in the zenith.
0° - 1° N.	17	A white glare in the sky.
	01	Smoky atmosphere.

GENERAL REMARKS.

The following extracts have been made from the "Remarks" in various Logs:—
NATURAL HISTORY.

Latitude.	Sub-square.	Remarks on Natural History.
<i>Land Birds and Insects.</i>		
9° to 10° N.	98	Three <i>Land Birds</i> .
8° - 9° N.	88	A <i>Martin</i> .
7° - 8° N.	71	Some <i>Swallows</i> ; there have been swallows and one variety of bird or another about the ship now for nine days. (Ship from North.)
	73	28th, 1859. A quantity of <i>Butterflies</i> and two large <i>Owls</i> , after heavy squalls from E.
6° - 7° N.	75	One or two <i>Swallows</i> .—A large <i>Moth</i> passed in a puff from S.W.
	76	A <i>Swallow</i> . (3 entries.)
	79	A little <i>Snipe</i> on board.
	60	Another small <i>Land Bird</i> on board, more like a sparrow.—Three or four small <i>Land Birds</i> on board.
	63	29th, 1859. A quantity of <i>Butterflies</i> .
	67	Two <i>Swallows</i> .
	68	A <i>Martin</i> flew into the cabin.— <i>Land Birds</i> about.

Latitude.	Sub-square.	Remarks on Natural History.
5° to 6° N.	56	Several <i>Swallows</i> , evidently much exhausted.
	57	Caught a <i>Swallow</i> completely exhausted, it had been flying round the ship several days. (Ship from the N.)
	58	A <i>Land Bird</i> (2 entries).
4° - 5° N.	43	A <i>Snipe</i> flew on board.
	48	A <i>Land Bird</i> , with a bill 3 inches long; body the size of a thrush; it was trying to reach the ship in a shower, but fell into the sea and was drowned; it had been flying about the ship three days. (Ship from N.)
3° - 4° N.	33	A small <i>Duck</i> of the teal tribe, and an <i>Owl</i> flying about the ship.
	37	Several <i>Swallows</i> still following the ship. (Ship from N.)
	38	Two or three small <i>Swallows</i> flying about, apparently very much exhausted.
		<i>Cetacea.</i>
6° - 7° N.	63	A number of <i>Bottle-noses</i> basking in the sun close to the ship.
	65	Several large <i>Whales</i> and <i>Blackfish</i> .
5° - 6° N.	55	Several large <i>Cetacea</i> .
4° - 5° N.	44	Several small <i>Cetacea</i> .
7° - 8° N.	76	Great numbers of <i>Blackfish</i> about the ship all day.
6° - 7° N.	65	Several large <i>Whales</i> and <i>Blackfish</i> .
5° - 6° N.	53	Several <i>Blackfish</i> .
4° - 5° N.	45	<i>Blackfish</i> .
6° - 7° N.	63	Many <i>Porpoises</i> going N.
5° - 6° N.	53	Plenty of <i>Porpoises</i> .
4° - 5° N.	44	<i>Porpoises</i> .
		NOTE.—It will be seen that all the <i>Cetacea</i> were seen between 4° and 8° N., where there was the least force of wind.
		<i>Fish, &c.</i>
1° - 10° N.	- -	<i>Albicore</i> s were seen in s.-ss. 97,* 83, 64, 55, 58, 42, 26, and 16. In 26 and 16 they are called <i>Tunny</i> . In s.-s. 55, shoals of <i>Albicare</i> and flocks of birds at the edge of the breeze in calm spots.
3° - 10° N.	- -	<i>Bonitos</i> „ „ 95, 84, 85, 53, 56, 42 twice, 42, 43, 43, 34.
4° - 9° N.	- -	<i>Dolphins</i> or <i>Coryphaena</i> „ 88, 57, 58, 43.
0° - 10° N.	- -	<i>Flying Fish</i> were seen in twenty-three sub-squares; they were very abundant in 43 and 29, and very large in 17.
5° - 9° N.	- -	<i>Sharks</i> were seen in s.-ss. 86, 74, 75 (twice), 52, and 58; in 86 a blue one 9 feet long was caught.
0° - 8° N.	- -	<i>Fish</i> (no names given) „ 75, 57, 31, 13, 09.
3° - 9° N.	- -	<i>Portuguese-men-of-war</i> „ 88, 75, 54, 55, 43, 37. In 54 some were large, others rudimentary.
		<i>Remarks.</i>
9° - 10° N.	91	Passed through a great quantity of large round matter, some a foot in diameter, it emitted strong flashes of light.
8° - 9° N.	81	A <i>Sun-fish</i> .
	85	Water very luminous with millions of <i>Diphydes</i> .

* One dot under a sub-square indicates that the creatures were abundant; two dots very abundant, &c.

Latitude.	Sub-square.	Remarks on Natural History.
6° to 7° N.	60	Large quantities of <i>Fish spawn</i> on the water of a light yellow colour; it streamed in a N. and S. direction.
5° - 6° N.	54	Many <i>Medusæ</i> of different kinds. <i>Mollusca</i> in groups.
		<i>Sea Birds.</i>
0° - 10° N.	- -	<i>Stormy Petrels</i> (Mother Carey's Chickens) were seen in thirty sub-squares and two or three times in several. They were very abundant in 55,* 47, 48, and 11, and abundant in nine other squares. They were most frequently seen and most abundant between 4° and 5° N. In s.-s. 71 a ship remarks on having had <i>Petrels</i> about the stern since leaving the English Channel.
2° - 8° N.	- -	<i>Boobies</i> were seen in s.-ss. 48 and 28, in 79 a bird like a booby.
0° - 10° N.	- -	<i>Birds</i> (supposed to have been <i>Sea Birds</i>) were seen in s.-ss. 98, 84, 75, 52, 55 (twice), 44 (three times), 45, 31, 33, 34, 21, 22, 23, 13, 16, 17, 19, 01, 08, 09. In 45, a <i>Gull</i> with black body, white belly. In 19, like a <i>Solan-Goose</i> . In 08 and 09, several large flocks (these were near St. Paul's Rocks).
		NOTE.—Birds, fish, and their food seem to have abounded between 4° and 5° N., where the Ely. and Wly. currents meet.

FALLING STARS.

There are 36 entries of Falling Stars, spread over 13 years, chiefly between 1855 and 1870: of these eight were in 1855, five in 1861 and 1862, three in 1856 and 1860, two in 1839, 1859, 1865, and 1869, and only one in each of the other four years. The following remarks seem worthy of extraction:—

Sub-square.	Hour.	Day.	Year.	Remarks on Falling Stars.
66	8.15 p.m.	25th	1839	Several meteors from E.S.E. to S.
88	Midt.	5th	1855	Shooting stars near the zenith, W. by S. to E. by N.
57	—	9th & 10th	1855	During the night, when it cleared up a little, and the clouds could be seen, there were large numbers of meteors flying from the zenith in all directions.
09	Midt. to 4 a.m.	15th	1855	A number of meteors shooting from N.W. to S.E.
67	8 p.m.	22nd	1856	Stars from opposite directions (N. and S.) across Taurus, Aries, and other constellations in the East.
47	Midt.	24th	1856	Several stars shot to the S.Wd.
39	4 a.m.	9th	1858	Stars shooting in different directions.
38	10 p.m.	3rd	1859	Stars shooting in several directions.
17	8 p.m.	17th	1859	Several meteors.
60	10 p.m. to midt.	4th	1860	Several meteors in the East shot towards the W.N.W.
70	10 p.m.	6th	1860	Several stars in E.S.E. shot towards the W.N.W., and one to the Sd.
96	10 p.m. to midt.	„	1861	Several meteors seen in different directions.
65	8 p.m.	10th	1862	Many falling stars passed through Lyra, Aquila, and Cygnus.
87	—	12th	1862	Several falling stars traversed Aquarius in a S.Wly. direction; motion very slow.
49	Midt.	11th	1863	Meteors falling to the Sd.
94	4 a.m.	13th	1865	Many stars shooting in all directions.
65	„	14th	1865	A few stars shooting in different directions.
41	„	„	1869	Shortly after midnight until daylight a great number of shooting stars seen in the breaks between the clouds.
07	?	„	1869	Many stars shooting to the N.Ed.

* One dot under a sub-square indicates that the creatures were abundant; two dots very abundant, &c.

TEMPERATURE OF RAIN AND AIR.

Sub-square.	Temperature of Rain.	Temperature of Air.
82	72°0	75°0
83	75°0	80°0
87	73°0	74°9
73	78°0	80°0
76	78°0	79°4
67	74°0	79°0
52	75°0	81°0
53	76°0	79°0
	77°0	79°0
	77°0	82°0
	75°5	79°0
	73°0	79°0
55	74°0	77°2
56	75°5	76°0
41	74°0	76°0
43	75°0	76°0
	16)82°0	16)132°5
Mean	75°1	78°3 Difference 3°·2

Latitude.	Sub-square.	VARIOUS.
9° to 10° N.	95	2nd, 1861. A fire ball in the N.E.
6° - 7° N.	65	2 p.m. Temperature in sun 115°, in shade 82°.
5° - 6° N.	51	9 a.m. Max. temp. during last 24 hrs. in sun 105°, in shade 82°. Ship from South.
3° - 4° N.	32	" " " " 109°, " 80°. "
	34	6 p.m. 1st, 1858. Comet just visible. "
0° - 1° N.	01	9 a.m. Max. temp. during last 24 hrs. : in sun 94°, in shade 79°. "

BEST ROUTES FOR CROSSING THE EQUATOR.

Appendix B. shows that in November the mean force of all winds is decidedly stronger in the Wn. than in the En. half of Square 39, more especially between 14° and 16° N., where the En. half has 17% of calms. By comparing the force of wind from the various quarters, in the two halves, it will be found that in nearly all cases where the percentage of a wind is sufficiently large to make it of any importance, the Wn. half has the stronger wind.

Appendix B. also shows that there is very much more S.Ely. wind in the Wn. than in the En. half of Square 39. The following table will be useful in showing the Navigator the three prevailing points in each quarter; for instance, he will learn that the prevailing S.Ely. wind in the Wn. half is generally East or E. by S. In the En. half, however, between 14° and 16° N., the prevailing S.Ely. wind is actually S.E. and Appendix B. shows that it is very light, though there is only 7% altogether.

TABLE 12.

The Direction of the three Prevailing Winds of each quarter of the compass, in each half of Square 39. They are in the order of their prevalence. A dash under a letter or figure indicates extreme prevalence.

Latitude.	N. to E. b. N., or N.Ely. Winds.		E. to S. b. E., or S.Ely. Winds.		S. to W. b. S., or S.Wly. Winds.		W. to N. b. W., or N.Wly. Winds.	
	Wn. half 25° to 30° W.		En. half 20° to 25° W.		Wn. half 25° to 30° W.		En. half 20° to 25° W.	
	Points from North.	Points from North.	Points from South.	Points from South.	Points from South.	Points from South.	Points from North.	Points from North.
18° to 20° N.	4, 6, 7	4, 2, 3	8, 7, 5	8, - -	7, 6, -	6, 4, 5	6, 7, 8	2, 7, 5
16° - 18° N.	4, 5, 7	4, 2, 3	8, 7, 6	8, - -	6, 1, 5	3, - -	2, 6, 1	1, 2, 5
14° - 16° N.	4, 7, 6	4, 3, 2	8, 7, 6	4, 5, 6	S., - -	5, 7, 2	3, 4, 7	8, 7, 5
12° - 14° N.	4, 3, 7	3, 4, 5	8, 7, 5	8, 7, 5	S., 2, 6	7, - -	2, 1, 8	5, 2, 1
10° - 12° N.	4, 7, 6	3, 4, 5	8, 7, 6	8, 4, 6	S., 3, 6	- - -	8, - -	1, - -

Table 12 shows that the three prevailing N.Ely. and S.Ely. winds of the Wn. half are much more Ely. in their direction than those of the En. half.

The percentages in Appendix B. should be considered before consulting Table 12, for instance, between 10° and 12° N. the N.Ely. winds in the En. half have 91% of all the winds, whilst the S.Ely. have only 5%, so that the wind is very much more likely to be N.E. b. N. than East in the En. half of that zone, though Table 12 alone does not show this.

The accompanying Chart for November, together with Table 2 and the prevailing wind arrows of the Diagram in the lower right-hand corner of the Chart, show that the winds are still stronger in the Wn. than in the En. half of Square 3. The red sections in the current circles, and the arrows showing the prevailing current on the Diagram of sea isotherms, show that Ely. currents still prevail from 4° to 10° N., though they are very Sly. in the Nn. part of the square, and generally lighter than they were in October. The same data also show that Wly. currents prevail from the Equator to 4° N., they are slightly weaker than they were in October, especially the N.Wly., though their percentage has increased.

Appendix C. shows that in November there is no difference in the mean directions of the prevailing winds in the En. and Wn. parts of Square 303. The comparison is best made by running a pencil line down each Table, and making it pass through the largest percentage in each degree of latitude; in each case the mean of the 10 points having the largest percentages is S.E. by E. $\frac{1}{4}$ E. By comparing the mean forces it is shown that from the Equator to 3° S., the winds are generally stronger between 33° and 35° W. than between 30° and 33° W. But from 3° to 10° S. they are very decidedly stronger in the En. than in the Wn. part, and on the whole they are decidedly the strongest in the En. part.

From the above facts it seems right that the *Outward-bound* ship should certainly pass to the Wd. of the Cape Verd Islands, and on meeting the Sly. winds, take the tack which gives the most Southing. The iron ship "Swarthmore," Capt. Lidbetter found a strong Wly. current near St. Paul's Rocks, at 4 p.m. of the 8th; she was in $1^{\circ} 31' S.$ and $30^{\circ} 42' W.$ at noon of the 9th; $4^{\circ} 17' S.$, $33^{\circ} 33' W.$ on the 10th; $7^{\circ} 8' S.$, $34^{\circ} 44' W.$ on the 11th; $10^{\circ} 1' S.$ and $34^{\circ} 50' W.$ on the 12th; so that the Wly. crossing did not lengthen her passage. The wind was S.E., drawing more Ely. as she got to the Sd., and the weather was fine. The Wly. current was not so strong after passing $4^{\circ} S.$

The *Homeward-bound* ship should cross the Equator to the Wd. of $25^{\circ} W.$, as the winds of the Wn. halves of Squares 3 and 39 are the strongest and most favourable, but if she has to pass through Square 303 she should endeavour to keep to the Ed. of $33^{\circ} W.$ until she has passed the parallel of $3^{\circ} S.$, by which means she will get stronger winds than if she were nearer the S. American coast.

DECEMBER.

Barometer.—The isobars (see the Diagram in the lower right-hand corner of the Chart), show that the highest pressure is still in the N.Wn. corner of the square, whilst the lowest is on its Wn. and En. sides.

The highest mean pressure in the lateral strips (29.955) is still between 9° and $10^{\circ} N.$, whilst the lowest (29.919) is between 3° and $4^{\circ} N.$ The direction of the isobars is very irregular, but they are close in the N.Wn. corner of the square, where the prevailing wind is fresh from N.E. A similar state of isobars and wind in the N.Wn. corner of the square existed in November, and also in the early months of the year, when the N.E. wind was strongest there.

Pressure has changed irregularly throughout the square; it has increased slightly between 9° and $10^{\circ} N.$, and again between 1° and $2^{\circ} N.$ The greatest fall has been between 3° and $4^{\circ} N.$ The Mean for the whole square (29.935) shows scarcely any change since November. The changes in the mean pressure for vertical strips show that it has increased in the Wn. and decreased in the En. half of the square since November; this is well shown by comparing the isobars for the two months: the reverse was the case between October and November.

Air Temperature.—A decrease of temperature has taken place between 6° and $10^{\circ} N.$ and an increase between 0° and $6^{\circ} N.$, the greatest decrease amounting to $1^{\circ} 3$ lies between 9° and $10^{\circ} N.$, and the greatest increase amounting to $0^{\circ} 5$ lies between 0° and $1^{\circ} N.$ The Mean Temperature for the square ($79^{\circ} 3$) shows a decrease of $0^{\circ} 2$ since November. The isotherms show an influx of cold air in the N.Wn. corner of the square, also that the exceptional heat which existed in its N.En. corner has disappeared, and that the hottest air is now on its En. side and in its S.Wn. corner.

Dry and Damp Bulbs.—The least mean difference of dry and damp bulbs ($3^{\circ} 0$) is still between 5° and $6^{\circ} N.$, whilst the greatest ($4^{\circ} 0$) is now between 9° and $10^{\circ} N.$ The increase is gradual between 5° and $10^{\circ} N.$; it increases to $3^{\circ} 4$ between 0° and $2^{\circ} N.$ Since November the difference has increased between 6° and $10^{\circ} N.$, and decreased between 1° and $4^{\circ} N.$ The greatest increase ($0^{\circ} 5$) has taken place between 9° and $10^{\circ} N.$, the greatest decrease ($0^{\circ} 2$) between 1° and $2^{\circ} N.$, and again between 3° and $4^{\circ} N.$ This shows how the Nn. part of the square is gradually getting drier, whilst the Sn. gets damper. The Mean Difference for the whole square ($3^{\circ} 4$) shows no change since November. A comparison of the vertical strips shows that the difference has decidedly increased on the Wn. and decreased slightly on the En. side of the square; the increase on the Wn. side is probably caused by the freshening of the N.E. wind there.

Sea Temperature.—The isotherms of sea temperature show that the highest temperature is on the En. side of the square. Those in the Sn. part of the square seem to trend slightly to the Nd. of West, whilst those in its Nn. part trend to the Sd. of West, as if they were governed by the prevailing currents, which take the same directions. The hottest sea is where the slight remainder of the Ely. current still lingers.

The temperature of the sea has decreased between 1° and 10° N. since November, but the change only averages 0°·1 in the Sn. half of the square, whilst it is 0°·5 between 5° and 6° N., and increases to 1°·5 between 8° and 10° N.

The vertical strips show that the decrease has been greater on the Wn. than on the En. side of the square. A comparison of the En. strips of the Charts shows that it has slightly *increased* in the S.En. corner of the square. The Mean Surface Temperature for the whole square (80°·0) shows a decrease of 0°·6 since November, whilst the air has only decreased 0°·2.

Specific Gravity.—The lowest specific gravity of the sea (1·0262) is between 4° and 5° N., it increases to 1·0269 between 8° and 9° N., and to 1·0274 between 1° and 2° N. By comparing the means for each strip with those for November, it is shown that there has been a decided increase between 5° and 10° N., and a very slight decrease between 0° and 5°. The specific gravity of the En. part of the square has increased, whilst that of the Wn. has decreased since November. The Mean for the whole square (1·0268) shows no change since November.

WIND.

TABLE 1.—LATERAL STRIPS.

Lateral Strips. 10° of Longitude by 1° of Latitude.	No. of Observa- tions.	Mean Force of Strip.	N. to E. by N. or N.Ely.		E. to S. by E. or S.Ely.		S. to W. by S. or S.Wly.		W. to N. by W. or N.Wly.		Variables.		Calms.	Prevailing Wind.		Strongest Wind.*	
			%	Mean Force.	%	Mean Force.	%	Mean Force.	%	Mean Force.	%	Mean Force.		No. of Observations. Direction.	Mean Force.	No. of Observations. Direction.	Mean Force.
9° to 10° N. -	166	4·1	87	4·3	9	3·5	—	—	—	—	1	2·8	3	N.E. ³⁸	4·6	N.E. by E. ¹⁹	4·7
8° - 9° N. -	174	3·9	83	4·0	10	4·0	1	2·0	—	—	5	2·7	1	N.E. ³¹	4·5	N.E. by E. ¹⁸	4·6
7° - 8° N. -	219	3·4	68	3·7	21	3·2	2	2·8	2	1·4	3	2·7	4	N.E. ²⁹	4·3	N.E. ²⁹	4·3
6° - 7° N. -	304	2·6	51	3·3	25	2·6	3	2·3	3	2·1	6	1·7	12	N.E. ²⁹	3·4	N.E. by E. ²²	3·5
5° - 6° N. -	330	2·2	32	3·1	34	2·7	4	1·8	3	1·7	11	1·8	16	E. ²⁴	2·6	E.S.E. ¹⁷	3·6
4° - 5° N. -	300	2·5	21	2·9	51	3·0	8	2·5	3	1·8	7	2·1	10	S.E. ²⁶	3·0	N.N.E. ¹⁰	3·6
3° - 4° N. -	278	2·9	13	2·8	67	3·4	3	2·4	2	2·5	6	2·4	9	S.S.E. ⁴⁰	3·4	S.E. by E. ²⁶	3·7
2° - 3° N. -	253	3·3	8	2·6	82	3·5	3	3·2	2	1·8	2	1·9	3	S.E. by S. ⁵⁷	3·4	S.S.E. ³⁸	3·7
1° - 2° N. -	201	3·6	4	3·4	93	3·7	1	2·8	—	—	1	2·5	1	S.E. by S. ⁵⁹	3·9	S.E. by S. ⁵⁰	3·9
0° - 1° N. -	178	3·9	2	5·0	96	3·9	2	3·8	—	—	—	—	—	S.E. by S. ⁴⁶	4·1	E. by N. ³	5·0

* In recording the Strongest Wind in a Strip, weight has been given to the number of observations; otherwise the direction and force of a single squall would frequently appear in this column.

TABLE 2.—VERTICAL STRIPS.

Vertical Strips. 10° of Latitude by 1° of Longitude.	No. of Observa- tions.	Mean Force of Strip.	N. to E. by N. or N.Ely.		E. to S. by E. or S.Ely.		S. to W. by S. or S.Wly.		W. to N. by W. or N.Wly.		Variables.		Calms.	Prevailing Wind.		Strongest Wind.*			
			%	Mean Force.	%	Mean Force.	%	Mean Force.	%	Mean Force.	%	Mean Force.		%	Mean Force.	No. of Observations. Direction.	Mean Force.	No. of Observations. Direction.	Mean Force.
20° to 21° W.	202	2·4	34	3·0	39	2·9	4	2·6	6	1·9	3	1·4	14	S.E. by S. ¹⁷	3·0	N. ⁵	3·6		
21° - 22° W.	266	2·7	29	3·2	51	3·2	5	1·8	3	1·6	4	1·5	8	S.S.E. ²⁹	3·5	N.E. ¹⁴	3·7		
22° - 23° W.	396	2·6	32	3·1	47	3·1	2	2·3	2	2·0	4	2·4	13	S.E. ³¹	3·2	N.E. by E. ¹³	4·0		
23° - 24° W.	260	3·1	37	3·4	45	3·4	3	2·1	3	2·1	8	2·2	4	S.E. by S. ²⁶	3·7	N.E. ¹⁰	4·4		
24° - 25° W.	321	3·2	39	3·6	41	3·6	3	2·4	2	2·2	7	2·5	8	S.E. ³²	3·6	S.E. by S. ²⁶	3·9		
25° - 26° W.	323	3·1	31	4·0	48	3·4	5	2·6	1	1·6	7	1·7	8	S.E. ³²	3·6	N.E. by E. ¹⁶	4·4		
26° - 27° W.	254	3·8	40	4·3	54	3·7	2	3·3	—	—	3	2·3	1	S.E. by S. ³¹	3·9	E. by N. ²⁹	4·6		
27° - 28° W.	174	3·5	41	3·7	54	3·4	2	3·3	—	—	2	1·7	1	S.S.E. ¹⁸	3·6	E.N.E. ⁸	4·3		
28° - 29° W.	131	3·6	32	3·8	63	3·6	1	5·0	—	—	2	2·3	2	S.E. by S. ²⁵	3·4	N.N.E. ³	4·7		
29° - 30° W.	76	4·0	27	4·5	70	4·0	1	2·5	—	—	1	2·5	1	S.E. by S. ¹⁸	4·1	N.E. by N. ⁴	5·4		

By comparing the means of the percentages in the *lateral* strips (Table 1.) with those for November, the following results are obtained for the whole square:—

N.Ely. winds 37 % and increased 15 % since November.
S.Ely. „ 49 „ and decreased 9 „ „
S.Wly. „ 2 „ „ 5 „ „
N.Wly. „ 2 „ not changed „
Variables „ 4 „ and decreased 1 „ „
Calms „ 6 „ not changed „

Hence N.Ely. winds have decidedly increased whilst S.Ely. and S.Wly. have decreased. On comparing the percentages in the various lateral strips, it is found that N.Ely winds have increased 31% since November between 7° and 9° N., the amount of increase gradually lessens as you go to the Southward, and is only 2% between 0° and 1° N. S.Ely. winds have decreased 14% between 6° and 10° N., and the amount of decrease gradually diminishes to 1% between 0° and 1° N.

The prevailing wind arrows on the Diagram compared with those for November show the Sn. advance of the N.E. Trade, and that there is still a zone of Ely. wind between the Trades. The “Prevailing Wind” column in Table 1, shows that this E. wind lies between 5° and 6° N., where the percentages of N.Ely. and S.Ely. winds are nearly equal, and there is the smallest mean force of wind.

The Mean of the mean forces of all winds in the 10 strips of Table 1, is 3·2, showing no change since November. But on comparing the mean forces for each strip it is found that between 6° and 10° N. they have increased, the increase amounting to 1·0

* In recording the Strongest Wind in a Strip, weight has been given to the number of observations; otherwise the direction and force of a single squall would frequently appear in this column.

between 7° and 8° N., whilst between 0° and 6° N. they have decreased, the decrease amounting to 0.5 between 1° and 4° N.; this seems to be entirely due to a very decided increase in the force of the N.E. and decrease in that of the S.E. Trade. The lowest mean force (2.2) lies between 5° and 6° N.; the highest (4.1) between 9° and 10° N. Calms have increased between 3° and 7° N., and decreased between 7° and 10° N. The Diagram shows that the isobars are closest where the N.E. wind is strongest.

Table 2, and a comparison of the En. and Wn. strips of the Chart show that most of the S.Wly. and all the N.Wly. winds were confined to the En. side of the square, where there were also nearly all the calms. They also show that the S.Wly. and N.Wly. winds were very light.

TABLE 3.

Latitude.	s.-s.	Winds, Force 7 or upwards, but not Squalls.	Direction of Squalls and Heavy Squalls.								s.-s.	REMARKS. NOTE. A bar, thus —, separates the Remarks of different Logs. The dates of the Trade limits are in the order of the sub-squares in which they occurred, beginning with the most En. one.				
			(All Squalls Force 7 or upwards are considered to be heavy.) (All Squalls on either side of N. S., E., or W., are given to their respective quarters, so that there are fewer from the above-named points than from the quarters.)													
			N.	N.E.	E.	S.E.	S.	S.W.	W.	N.W.						
			Heavy.	Heavy.	Heavy.	Heavy.	Heavy.	Heavy.	Heavy.	Heavy.						
9° to 10° N.	92	N.E. 7 (2 entries.)	-	-	-	-	-	-	1	-	-	-	-	-	91	Sn. limit of N.E. Trade on 1st.
															90	Fresh squalls from the Sd. with t. l. and r., but wind continued from the Ed.
															93	Little wind, but very heavy r. in squalls.
8° - 9° N.	83	N.Ely. 7 (2 entries.)	-	-	-	-	1	-	2	-	-	-	-	-	82-88	96 Sn. limit of N.E. Trade on 9th, 9th, and 2nd.
															83	Light puffs, with drenching showers.
7° - 8° N.	73	N.Ely. 7	-	-	1	-	1	-	1	1	-	1	-	-	74-78	88 Sn. limit of N.E. Trade 8th, 11th, 15th, 1st, 21st.
	78	E. 7													72	Wind variable with force 7 in squalls.
															73	Wind flew from E.N.E. to S.E. in a squall.—Very heavy S.W. squall with vivid l. and t.
6° - 7° N.	62	E. 7	-	-	2	1	2	-	3	1	2	-	-	-	66	Sn. limit of N.E. Trade on 31st.
															62	Wind shifted from N. to S. with drizzle.
															63	Wind suddenly shifted from S. to N., then round compass, and back to N.
															65	7th. Midt. to 6 a.m. Fresh breeze, shifting from N.E. by N. to E.S.E., and back with continuous heavy rain, then settled into N.E. Trade.—Wind shifted from E. by N. to S. by E. in a squall with r.
															67	Wind very variable; 7 points at a time. Wind from S.S.E. to E.N.E., and very variable. 30th. The N.E. has been more like the S.E. Trade.
5° - 6° N.	52	E.S.E. 7	-	-	-	2	-	1	2	1	-	-	-	-	50&56	Sn. limit of N.E. Trade, 20th and 22nd.
															51-57	Nn. limit of S.E. Trade 11th, 12th, 18th, 17th, 17th.
															51	10th. Strong N. by E. breeze.—11th. Got the S.E. Trade, Variables only 50 miles broad.—Steady N.E. Trade.
															54	A very heavy squall from N.E.
															55	7th. Wind shifted suddenly from N.E. to S.E. with dirty weather.—12th. Wind shifted from E. by N. to S.E. by E. in a squall.
															57	Wind inclined to be squally and veering between E.S.E. and N.N.E., then fol- lowed by a steady N.E. breeze.

TABLE 3—continued.

Latitude.	s.-s.	Winds, Force 7 or upwards, but not Squalls.	Direction of Squalls and Heavy Squalls. (All Squalls Force 7 or upwards are considered to be heavy.) (All Squalls on either side of N., S., E., or W., are given to their re- spective quarters, so that there are fewer from the above-named points than from the quarters.)									s.-s.	REMARKS. NOTE. A bar, thus —, separates the Remarks of different Logs. The dates of Trade limits are in the order of the sub-squares in which they occurred, beginning with the most En. one.							
			N.	N.E.	E.	S.E.	S.	S.W.	W.	N.W.										
			Heavy.	Heavy.	Heavy.	Heavy.	Heavy.	Heavy.	Heavy.	Heavy.										
4° to 5° N.	—	—	—	—	1	—	1	—	—	1	—	—	—	—	—	—	—	45 & 46	Sn. limit of N.E. Trade on 21st, 31st, 24th, and 26th.	
																		42	Squalls, force 8, direction S.E. to N.E. 20th regular Doldrums.	
																		44	Fine steady N.N.E. breeze.—Decreasing S.E. Trade.	
																		45	Wind suddenly from S.E. to N.E. with heavy r.	
																		46	Wind shifting in Squalls from S. by E. to N. by W.	
																		48	Wind very variable from N.E. to S.E. for 2 hrs. with heavy r.	
3° - 4° N.	—	—	—	—	1	—	—	2	—	4	2	—	—	—	—	1	—	—	32 & 38	Sn. limit of N.E. Trade on 28th and 5th.
																		32-36	Nn. limit of S.E. Trade on 28th, 31st, 20th.	
																		32	28th. Passed from S.E. to N.E. Trade after short interval of calm.	
																		33	S.S.E. squalls at intervals of about an hour.	
																		36	A heavy squall lasting about an hour; little rain.	
																		38	Wind N.E., force 6. (2 entries.)	
2° - 3° N.	23	S.E. 7 (3 entries.)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	23-28	Nn. limit of S.E. Trade, 23rd, 23rd, 25th, 25th, 28th.
	25	E.S.E. 7	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	26	Wind changing from E. by N. to N.E.
																		28	19th. In S.E. Trade with less than 4 hrs. calm between the Trades.	
1° - 2° N.	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	12 & 16	Nn. limit of S.E. Trade 26th and 29th.
																		10	Heavy black looking q. with heavy r. for 1½ hrs., then gradually moderating.	
																		05	Squall rising in the N.E., no wind.	
0° - 1° N.	—	—	—	—	—	—	—	—	2	—	—	—	—	—	—	—	—	—		
Sum	—	12, of which 5 are N.Ely., 5 S.Ely., and 2 Ely.	—	2	3	4	5	2	11	6	6	—	—	1	1	—	—	—		

NOTE.—A comparison of Table 3 with that for November is not a fair test as to the relative percentage of squalls in each month, for there were above a half more observations for Square 3 in Nov. than in Dec. Still a comparison of the percentages in Table 9 shows that the number of squalls is decidedly less in Dec., especially in the Nn. part of the square. This may be related to the disappearance of the hot winds in the N.En. corner. S.Ely. squalls still prevail, but those from E. are much increased and very abundant when it is remembered that they are from only one point of the compass. Wly. squalls scarcely exist. By giving the dates when the Sn. limits of the N.E. Trade were observed, it is shown how they appeared further South as the month advanced.

The number of strong winds was 16 in November and is now only 12, but the decrease is merely the result of there having been much fewer observations in December, by calculating the percentages a slight increase is shown since November. The note shows that squalls have however decidedly decreased.

CURRENTS.

TABLE 4.—LATERAL STRIPS.

Lateral Strips. 10° of Longitude by 1° of Latitude.	No. of Observa- tions.	Mean Rate.	N. to E. by N. or N.Ely.		E. to S. by E. or S.Ely.		S. to W. by S. or S.Wly.		W. to N. by W. or N.Wly.		None.	Prevailing Current.		Strongest Current.*	
			%	Mean Rate.	%	Mean Rate.	%	Mean Rate.	%	Mean Rate.		No. of Observations. Direction.	Mean Rate.	Direction.	Rate.
9° to 10° N.	27	12	4	12	15	20	30	13	33	14	18	W.S.W. ³	14	S.S.E.	27
8° - 9° N.	26	10	—	—	15	14	31	15	23	14	31	W.S.W. ⁴	15	W.S.W.	26
7° - 8° N.	28	13	7	14	29	17	21	16	18	21	25	W. by S. ³	16	W.	35
6° - 7° N.	37	12	11	9	19	18	35	14	16	13	19	E. ⁴	17	W.S.W.	33
5° - 6° N.	31	11	22	21	29	13	10	8	10	15	29	E. ⁵	12	E. by N.	30
4° - 5° N.	29	14	28	13	31	19	3	18	21	18	17	E. ⁴	26	E.	35
3° - 4° N.	29	13	3	15	28	16	7	8	41	18	21	W. by N. ³	28	W. by N.	49
2° - 3° N.	36	20	14	20	—	—	8	13	72	22	6	W.N.W. ⁸	20	N.W. by W.	48
1° - 2° N.	35	25	6	28	—	—	20	26	63	30	11	W. ⁷	23	W.N.W.	73
0° - 1° N.	28	20	4	21	—	—	18	25	64	22	14	W. by N. ⁵	23	W.	38

TABLE 5.—VERTICAL STRIPS.

Vertical Strips. 10° of Latitude by 1° of Longitude.	No. of Observa- tions.	Mean Rate.	N. to E. by N. or N.Ely.		E. to S. by E. or S.Ely.		S. to W. by S. or S.Wly.		W. to N. by W. or N.Wly.		None.	Prevailing Current.		Strongest Current.*		
			%	Mean Rate.	%	Mean Rate.	%	Mean Rate.	%	Mean Rate.		%	No. of Observations. Direction.	Mean Rate.	Direction.	Rate.
20° to 21° W.	30	16	7	9	33	16	7	16	33	26	20	W.N.W. ⁴	26	W. by N.	44	
21° - 22° W.	38	16	11	19	24	17	10	15	42	21	13	E. ⁷	19	W. by N.	43	
22° - 23° W.	43	15	21	19	14	12	23	15	26	22	16	W. by N. ⁴	26	W. by N.	41	
23° - 24° W.	39	13	13	12	15	16	31	15	26	16	15	W. by S. ⁵	19	W. by S.	36	
24° - 25° W.	38	17	3	25	29	19	21	18	37	21	10	W.N.W. ⁶	17	N.W by W.	48	
25° - 26° W.	34	15	3	10	12	19	6	25	50	22	29	W.N.W. ⁴	28	W.N.W.	73	
26° - 27° W.	31	12	16	17	10	15	22	14	26	19	26	W.S.W. ³	19	N.E. by N.	31	
27° - 28° W.	20	18	10	25	—	—	15	20	50	25	25	N.W. ³ by N.	25	N.W. by N.	43	
28° - 29° W.	23	15	4	18	—	—	26	17	48	20	22	W. ⁴	18	N.W. by W.	41	
29° - 30° W.	10	19	10	13	—	—	20	22	60	22	10	W. ²	28	W.	34	

* The Strongest Current in each Strip is here given, as it is important to the Navigator to know the extreme to which he is liable.

Table 4 shows that Wly. currents prevail from the Equator to 4° N. where they are chiefly N.Wly., and again, from 6° to 10° N. where they are chiefly S.Wly. Ely. currents prevail between 4° and 6° N.; the Chart, Diagram, and Table 5 show that they are chiefly on the En. side of the square. Between 6° and 10° N. there has been a very decided increase in the percentage of Wly., and decrease in that of Ely. currents, especially between 8° and 10° N., where the change amounts to nearly 30 %. The percentage of "No Current" has decidedly decreased between 4° and 10° N., and slightly increased between 0° and 4° N. In the Nn. part of the square S.Wly. currents have increased more than any other.

The "Prevailing Current" column in Table 4 shows that S.Wly. currents prevail between 7° and 10° N., Ely. between 4° and 7° N., and N.Wly. between 0° and 4° N., which seems to show how the Westerly current in the Nn. zone is the result of the N.E. Trade, whilst that in the Southern zone is produced by the S.E. Trade, and that the Ely. current is a back drift of water which has been heaped by the meeting of the two winds. By comparing the current arrows on the Diagrams for November and December, it is shown how the Southern progress of the N.E. Trade has converted the S.Ely. current of November into a Wly. and S.Wly. current in December.

The isotherms seem to show that the N.E. and S.E. Trades bring cool water into the Nn. and Sn. parts of the square, whilst the Ely. current, which is chiefly on the En. side of the square, keeps an equal temperature of between 80° and 81° F.

The mean rate of current has increased, but it is chiefly due to the increase in the speed of Wly. currents in the Sn. part of the square. Table 5, compared with that for November, shows that although Ely. currents have decreased, the decrease has been confined to the Wn. side of the square. Between 20° and 21° W. there is as much Ely. as Wly. current, whilst between 28° and 30° W. there is 70% more Wly. than Ely.

Current Rips were most frequently seen between 6° and 7° N., and again between 2° and 3° N., in the latter zone they were all heavy. Between 4° and 7° N., the Remarks speak much more of Ely. than of Wly. currents, whilst Ely. currents are not mentioned to the Nd. of 7° N., and only once to the Sd. of 4° N. Hence the Current remarks agree well with Table 4, and both support the remarks on rips, for they would be expected where the opposing currents meet.

The following remarks seem worthy of extraction :—

Latitude.	Sub-square.	Remarks on Current.
		NOTE. A bar, thus —, separates the Remarks from different Logs.
7° to 8° N.	71	Strong tide rips, about 200 feet broad.
	74	Exceedingly strong current rippings, toppling to S.E. (wind N.E. 5).
5° - 6° N.	52	Short ripple caused by E. wind meeting N.E. current.
4° - 5° N.	40	Tide rip stretching beyond sight E. and W., but not more than 50 feet broad, wind Nly.
3° - 4° N.	31	A line of strong rippings extending in an E. and W. direction as far as the eye could reach, wind S.S.Ely.

SEA.

The sea was remarked upon as "luminous" 31 times: of these, 21 were in the Nn. and 10 in the Sn. half of the square. The largest number in any one strip was 6, they were between 9° and 10° N., of these, 3 were "very luminous."

There were no remarks on the sea being "deep blue." In s.-s. 12 it was "green."

Latitude.	Sub-square.	Remarks on Sea. NOTE. A bar, thus —, separates the Remarks from different Logs.
9° to 10° N.	92	Between 8 p.m. and midnight sea very phosphorescent; drew a bucket of water, which on examination in the morning, contained a number of insects like mosquitoes.
8° - 9° N.	93	Passed through a belt of phosphoric animalcules, very brilliant and in myriads.
7° - 8° N.	83	Passed through a space closely covered with small round lumps of phosphorescent matter.
6° - 7° N.	75	Water luminous in patches.
6° - 7° N.	64	Water very luminous. Caught several pieces, which in appearance were like a corn or pepper pod, after the corn or pepper is removed. Water all on fire and very bright in patches.
5° - 6° N.	55	Passed a line of foam, stretching from E. to W. as far as the eye could reach, from the deck. (Wind had been light S.S.E.)
3° - 4° N.	58	Sea very phosphorescent in patches.
3° - 4° N.	33	Sea very much illuminated in the wake, like a line of fiery water. Some of the patches appeared to be 150 or 200 fathoms long.
1° - 2° N.	16	Sea luminous, as if studded with phosphorus.
<i>Sea Temperature.</i>		
4° - 5° N.	48	1st, 1857. H.M.S. "Cyclops" sounded in 2,100 fathoms Temperature at surface, 79° - specific gravity, 1.0263. At 1,000 fathoms, max. 76°·5, min., 42°·5 " 1.0267. At 1,500 " " 79° " 39°·4 " 1.0271.
2° - 3° N.	28	9 a.m., 2nd, 1857. H.M.S. "Cyclops" sounded in 1,080 fathoms. Temperature at surface, 79°·5, - specific gravity, 1.0273. At 1,080 fathoms, max. 72° min., 38°·5 " 1.0254. At 800 " " 66° " 46° " 1.0266.
0° - 1° N.	09	1.20 p.m., 3rd, 1839. H.M.S. "Terror" sent down Massey's lead with 330 fathoms. Temperature at surface, 80°. At 136 fathoms, Six's thermometer No. 364, max. 78°, min., 53°·8. At 239 " " No. 365, " 79°·5, " 49°·5.

NOTE.—It seems probable that the difference between the temperature at the surface and that of the maximum thermometer may be the result of a shaking down of the index, as the maximum and minimum ought to have been set to the surface temperature before starting.

The Eastern and Western strips of the Chart show that between 6° and 10° N. in December, swells or seas from some Nn. quarter prevail over all others; also that confused seas are more common in the Sn. than in the Nn. part of the square; and much more frequent on the En. than on the Wn. side; the largest percentage of confused sea is between 2° and 6° N., in the En. half of the square, this, it will be noticed, is where there is the most Ely. current, which runs counter to the prevailing wind. Seas from some Sn. quarter are more common on its Wn. than on its En. side, excepting between 6° and 8° N.

CLOUDS.

Tables 6, 7, and 8, with the remarks on Clouds, are compiled from the data for 1° sub-squares.

TABLE 6.—LATERAL STRIPS.

PERCENTAGES of each FORM, and MEAN AMOUNT of all CLOUDS.

Lateral Strips. 10° of Longitude by 1° of Latitude.	No. of Observa- tions.	Upper Clouds.			Lower Clouds.				Amount, 10 being "Com- pletely Clouded."	
		Cir.	Cir.-c.	Cir.-s.	Cum.	Cum.-s.	Str.	Nim.	No. of Obs.	Mean.
		%	%	%	%	%	%	%		
9° to 10° N. -	90	19	14	9	50	10	10	8	116	5.0
8° - 9° N. -	100	7	10	9	50	13	13	18	124	6.0
7° - 8° N. -	118	5	14	12	42	14	10	17	150	6.1
6° - 7° N. -	180	9	13	8	44	19	12	26	216	6.3
5° - 6° N. -	179	8	13	9	47	13	9	30	229	6.7
4° - 5° N. -	177	6	16	7	47	15	7	26	231	6.6
3° - 4° N. -	175	6	10	4	41	15	10	35	204	6.2
2° - 3° N. -	153	12	17	5	41	20	4	20	201	5.5
1° - 2° N. -	107	16	18	8	47	11	7	5	152	4.9
0° - 1° N. -	103	7	18	4	61	9	7	4	137	5.1

TABLE 7.—VERTICAL STRIPS.

PERCENTAGES of each FORM, and MEAN AMOUNT of all CLOUDS.

Vertical Strips. 10° of Latitude by 1° of Longitude.	No. of Observa- tions.	Upper Clouds.			Lower Clouds.				Amount, 10 being "Com- pletely Clouded."	
		Cir.	Cir.-c.	Cir.-s.	Cum.	Cum.-s.	Str.	Nim.	No. of Obs.	Mean.
		%	%	%	%	%	%	%		
20° to 21° W. -	90	11	17	7	39	13	4	20	145	6.2
21° - 22° W. -	126	3	14	6	40	25	4	18	200	6.5
22° - 23° W. -	198	11	9	11	56	13	6	25	298	6.1
23° - 24° W. -	132	14	11	13	45	15	9	27	159	6.3
24° - 25° W. -	197	7	16	7	47	13	13	24	240	5.5
25° - 26° W. -	225	3	14	1	49	16	8	20	238	5.9
26° - 27° W. -	169	8	16	10	44	11	10	17	199	5.8
27° - 28° W. -	117	14	16	7	49	12	10	24	137	5.8
28° - 29° W. -	89	15	18	8	39	12	18	16	97	5.6
29° - 30° W. -	39	13	23	10	38	23	5	10	47	5.3

The mean of the means in the strips of Table 6 shows that the Mean Amount of Cloud is 5·8, or very nearly the same as that for November, but by comparing the means for each strip, it is shown that the Amount of Cloud has decreased between 7° and 10° N.; the decrease amounting to 1·0 between 9° and 10° N., whilst it has increased between 0° and 5° N., the increase amounting to 0·8 between 0° and 1° N.

The mean of the percentages of Nimbus in the 10 strips (19°/.) shows a mean decrease for the whole square of 6°/ since November; this decrease has chiefly taken place between 7° and 10° N., but there has been a slight decrease in all other strips, excepting those between 2° and 4° N., where there has been a decided increase. The largest percentage of Nimbus (35°/.) lies between 3° and 4° N., it averages 30°/ between 3° and 6° N. The least force of wind in Table 1 indicates that the centre of the Doldrum lies between 5° and 6° N. in December, where there is also the largest Amount of Cloud.

Table 7 shows that the largest percentage of Nimbus is still between 23° and 24° W., where there are also the largest percentages of lightning, squalls, and rain. The Amount of Cloud has increased in the En. and decreased in the Wn. half of the square since November.

TABLE 8.

The following Table is derived from the Remarks on Clouds in December:—

NOTE.—All clouds entries from N. to E. b. N. inclusive have been given to the N.En. quarter.

“ E. b. S. to S. “ S.En. “
“ S. b. W. to W. b. S. “ S.Wn. “
“ W. b. N. to N. b. W. “ N.Wn. “

Upper clouds from E. or W. have been extracted in the Remarks. Lower clouds flying with the wind have not been recorded.

Quarters from which the Clouds and Wind came.		Lower Clouds.			Clouds (doubtful whether upper or lower).			Upper Clouds.		
Clouds from.	Wind from.	Total No. of Observa-tions.	No. in Nn. Half of Square.	No. in Sn. Half of Square.	Total No. of Observa-tions.	No. in Nn. Half of Square.	No. in Sn. Half of Square.	Total No. of Observa-tions.	No. in Nn. Half of Square.	No. in Sn. Half of Square.
N.En.	N.En.	—	—	—	—	—	—	6	3	3
“	S.En.	—	—	—	5	1	4	16	1	15
“	S.Wn.	1	—	1	—	—	—	1	—	1
“	S.	—	—	—	1	—	1	—	—	—
“	E.	—	—	—	1	—	1	—	—	—
		1	—	1	7	1	6	23	4	19
S.En.	N.En.	1	1	—	6	4	2	20	18	2
“	S.En.	—	—	—	—	—	—	5	—	5
“	S.Wn.	—	—	—	2	1	1	—	—	—
“	N.Wn.	—	—	—	1	—	1	—	—	—
“	S.	—	—	—	1	—	1	—	—	—
“	E.	—	—	—	3	3	—	2	1	1
		1	1	—	13	8	5	27	19	8
S.Wn.	N.En.	—	—	—	1	—	1	7	6	1
“	S.En.	—	—	—	4	3	1	3	2	1
“	N.	—	—	—	—	—	—	1	1	—
“	E.	1	1	—	3	1	2	—	—	—
		1	1	—	8	4	4	11	9	2
N.Wn.	N.En.	—	—	—	—	—	—	1	1	—
“	S.En.	—	—	—	—	—	—	3	1	2
“	N.Wn.	—	—	—	—	—	—	2	—	2
“	En.	—	—	—	—	—	—	1	—	1
		—	—	—	—	—	—	7	2	5

NOTE.—The following are the percentages of upper clouds from the various quarters, 68 being the total number of observations.

From the N.En. quarter 34°/ being + 19°/ since November.

“ S.En. “ 40 “ “ — 9 “ “
“ S.Wn. “ 16 “ “ — 9 “ “
“ N.Wn. “ 10 “ “ — 1 “ “

In December there were only 68 observations of upper clouds in all parts of the square, which is 27 fewer than in November. They are equally divided between the Nn. and Sn. halves of the square. In the Nn. half the largest number of upper clouds from any one quarter with any one wind is 18 from the S.Ed., wind N.Ely.; whilst in the Sn. half it is 15 from the N.Ed., wind S.Ely. The Upper Clouds and Clouds from N.E. were nearly all in the Sn. half of the square, whilst those from S.E. and S.W. were chiefly in the Nn. half. The above percentages show that upper clouds from all but the N.En. quarter have decreased; this change is just the reverse of what took place in November.

The following remarks on Clouds have been extracted from the logs :—

Latitude.	Sub-square.	Remarks on Clouds. NOTE. A bar, thus —, separates the Remarks from different Logs.
9° to 10° N.	90	Upper clouds fast from the Sd., wind N.E. (2 entries.)
	95	Upper clouds from S.Wd., lower from E. by N., wind N.E. by N. to E. by S. Cir.-c. from S.Wd. and S.Ed., wind N.E. by N. to E. by S.
	97	Three different strata of clouds all from different directions: the highest cir. from N.E., the second cir.-c. from N., the lowest cum. driving from S.; wind N.E.
8° - 9° N.	84	Clouds from E., wind N.E.
	85	Upper clouds from S.W., lower from S. by E., wind variable.
7° - 8° N.	71	Cir. from N., wind N.E.
	72	Light fleecy cum. from E.S.E. and E.N.E., with cir. overhead, wind N.
	73	Upper clouds from S.S.W., no wind.*
	75	Clouds from all directions, wind Ely.
6° - 7° N.	62	Upper clouds from S.S.E., no wind.
	63	Cir.-s from S.W. by W. Nim. from N.E. by E., wind E.S.E.
	64	Cloud banks continually rising in S., and breaking up into detached clouds before gaining the zenith.—Heavy black inky clouds all round the horizon.
	65	Clouds from S. by E., no wind.—Clouds from E.S.E., no wind.
5° - 6° N.	51	Nim. and cir.-c. from all parts, wind variable.
	52	Heavy masses of cum. and nim. all round (two entries). Masses of nim. in S., wind W.S.W.
	53	Clouds from E. by N., no wind.
	54	Clouds from W. by N., no wind.—Upper clouds from S. by E., lower fast from N. by W., wind variable, 1 (two entries).
	55	Three strata of clouds: upper from W.N.W., middle from E.S.E., lower with the wind from N.N.E.—Clouds fast from S.E. by E., no wind. Clouds from E.S.E. fast, wind variable. 1 (two entries).—Cir. from W., wind variable.
	56	Clouds all from S., very high, wind E. Cir.-c. (very closely packed) from S.S.E., wind E.
4° - 5° N.	40	Clouds from N.N.E., no wind.—Clouds from N.N.W., no wind.
	44	Clouds fast from N.E., wind variable. Upper clouds from S. by E. and N. by E., wind variable.
3° - 4° N.	34	Upper clouds from S. by W., lower from N.E. by N., no wind.—Upper clouds from S. by E., lower from N. by E., wind variable.
	36	Clouds from S.E. by E., no wind.
	38	Clouds from N.E. by N., wind E. by N.
2° - 3° N.	27	Clouds from S.S.E., wind E. by S.—Clouds from E. by N., wind N. by E.—Dark, cum. and nim. in N.E. and E., with flashes of sheet l. issuing throughout.
	29	Clouds from all directions, upper scud from S.Wd., middle from N.Ed., lower with wind from S.Ed.
1° - 2° N.	15	During the last 48 hours there has been a peculiar kind of haze or rather thin fog-cloud flying low and rapidly with the wind from S.E. (ship from N.)
	16	Heavy clouds, resembling dense smoke.
0° - 1° N.	09	Heavy cum. all round horizon.

* No wind, means that it was calm at the time.

WEATHER.

TABLE 9.—LATERAL STRIPS.

Lateral Strips, being 10° of Longitude by 1° of Latitude.	Thunder. (t.) %	Lightning. (l.) %	Squalls. (q.) %	Rain. (r.) %	Mist or Haze. (m.) %	Dew. (w.) %
9° to 10° N. - - -	2	4	4	5	30	$\frac{2}{3}$
8° - 9° N. - - -	2	10	7	6	25	$\frac{2}{3}$
7° - 8° N. - - -	8	17	11	16	17	1
6° - 7° N. - - -	11	20	12	23	14	1
5° - 6° N. - - -	10	20	11	21	7	$\frac{1}{3}$
4° - 5° N. - - -	4	13	7	18	5	$\frac{2}{3}$
3° - 4° N. - - -	4	9	14	16	9	$\frac{2}{3}$
2° - 3° N. - - -	$\frac{1}{3}$	5	8	6	12	$\frac{2}{3}$
1° - 2° N. - - -	1	3	2	5	8	4
0° - 1° N. - - -	$\frac{1}{2}$	$\frac{1}{2}$	4	6	3	3

TABLE 10.—VERTICAL STRIPS.

Vertical Strips, being 10° of Latitude by 1° of Longitude.	Thunder. (t.) %	Lightning. (l.) %	Squalls. (q.) %	Rain. (r.) %	Mist or Haze. (m.) %	Dew. (w.) %
20° to 21° W. - - -	7	11	3	10	4	1
21° - 22° W. - - -	8	15	8	17	12	2
22° - 23° W. - - -	5	12	9	13	15	$\frac{2}{3}$
23° - 24° W. - - -	7	16	13	20	15	$\frac{2}{3}$
24° - 25° W. - - -	8	12	10	16	16	2
25° - 26° W. - - -	3	11	10	13	13	1
26° - 27° W. - - -	2	8	7	11	11	2
27° - 28° W. - - -	$\frac{1}{2}$	8	9	10	9	$\frac{1}{3}$
28° - 29° W. - - -	3	9	7	15	5	$\frac{2}{3}$
29° - 30° W. - - -	1	1	5	3	7	1

TABLE 11.—LIGHTNING.

This Table gives the bearing on which Lightning was seen in the various Lateral Strips. Only the bearings recorded as actually N., S., E., and W. have been given to those points.

Lateral Strips, being 10° of Longitude by 1° of Latitude.	Number of Observations.	N.	N.Ely.	E.	S.Ely.	S.	S.Wly.	W.	N.Wly.	All round.	No direction given.
9° to 10° N. - - -	6	-	2	-	-	-	2	-	1	-	1
8° - 9° N. - - -	12	-	1	-	7	1	2	-	-	-	1
7° - 8° N. - - -	24	2	2	2	6	3	2	1	-	2	4
6° - 7° N. - - -	28	2	4	2	4	3	2	1	2	1	7
5° - 6° N. - - -	43	4	7	3	2	1	2	3	4	6	11
4° - 5° N. - - -	20	2	7	1	3	1	-	-	3	-	3
3° - 4° N. - - -	6	2	1	2	-	-	-	-	-	-	1
2° - 3° N. - - -	5	1	3	-	-	-	-	-	-	1	-
1° - 2° N. - - -	4	1	3	-	-	-	-	-	-	-	-
0° - 1° N. - - -	1	-	-	-	-	-	-	-	-	-	1
Total for the month and how distributed	149	14	30	10	22	9	10	5	10	10	29

The means of the various percentages in Table 9 compared with those for November show that thunder, lightning, mist, and dew have increased, whilst squalls and rain have decreased. The greatest increase in the percentage of thunder and lightning lies between 3° and 7° N.; they have very decidedly decreased between 7° and 10° N., where there has also been the greatest decrease in squalls and rain; but mist has very much increased in the same zone, the increase amounting to 19 % between 9° and 10° N. The mist is no doubt caused by the red dust which appears on ship's sails in December, and is brought by the N.Ely. wind into the Nn. part of the square, where its percentage increases as that of rain (which washes the air) decreases. A comparison of Tables 1 and 9 shows that the largest percentages of thunder, lightning, and rain are between 5° and 7° N.; whilst between 5° and 6° N. the percentages of N.Ely. and S.Ely. winds are nearly equal.

Between 1° and 8° N. about one squall in every 10 was heavy. Very heavy squalls were recorded in s.-ss. 73 and 54; they are remarked on in Table 3.

The largest amount of dew is still in the Sn. part of the square, where the isotherms of sea temperature are pretty close, and the cool Wly. current prevails. In January and the following months, as the Nly. wind brings down the cooler water from the North, the largest amount of dew is in the Nn. part of the square.

Table 10 and the En. and Wn. strips of the Chart show that there is more unsettled weather on the En. than on the Wn. side of the square; also that mist is most abundant and has increased more on its En. than on its Wn. side since November.

Table 11, compared with that for November, shows a great decrease in the number of times that the bearing of lightning has been recorded. Between 7° and 10° N. it was much the most frequently seen on some Sly. bearing, between 6° and 7° N. the Nly. and Sly. bearings were nearly equal, whilst to the Sd. of 6° N. Nly. bearings were much the most prevalent. Between 5° and 6° N. it was more frequently seen on E. and W. bearings, and "all round" than in any other strip, as if this were the centre line of the source of lightning. Table 1 shows that it is also the zone of least wind, and that the N.Ely. and S.Ely. winds have nearly an equal percentage there. In November no lightning was seen to the Westward. There is still much more lightning on N.Ely. and S.Ely. than on N.Wly. and S.Wly. bearings.

The following remarks on Weather have been extracted from the Logs; they give the direction in which *various kinds* of lightning were seen, &c. :—

Latitude.	Sub-square.	Remarks on Weather. NOTE. A bar, thus —, separates the Remarks from different Logs.
9° to 10° N.	92	Much sheet l.—Close, damp, and clammy (two entries).
	96	Sharp l. in S.W.
8° - 9° N.	83	After sunset dark clouds rose in the N.N.E., accompanied by l. darting upwards, which glimmered in the cloud for a few seconds after each flash, and distant thunder.
	84	Fine weather, with much l. after 6 p.m., and the appearance of large masses of cloud in the Sn. horizon while the flash is bright, but no cloud seen in the intervals.
	85	Sheet l. in S.S.E.—Sharp chain l. in S.W.
	87	Clear over head, but dense fog near horizon; wind N. b. E. 5.

Latitude.	Sub-square.	Remarks on Weather. NOTE. A bar, thus —, separates the Remarks from different Logs.
7° to 8° N.	71	Very oppressively close.
	73	Sheet l. on the horizon from N.N.W. to E.S.E.—Short claps of distant t., constant l. first in E. and S.E., afterwards all round.—Very heavy r. with terrific l.; the peals of t. which followed immediately after the flashes shaking the ship, and making the masts and yards vibrate. Forked l. playing all round, and very heavy t. shaking ship.—Sheet l. in S. and S.W. from heavy bank of cloud.
	75	Sixteen days of rain, with one exception. (This remark is from the log of the Barque "Chalco" from the West Coast of Africa; on the 3rd she was in 7° 19' N., 25° 6' W.; 16 days previous in 3° 2' N., 23° 57' W.)
6° - 7° N.	76	Sheet l. in S.—Sheet l.
	79	Whitish haze round horizon.
	60	Very sultry and hot (two entries).
	61	Two waterspouts in the N.N.E. going to the Wd., distant about 4 miles; they were of short duration.—Flash l. in N.N.W., very vivid l. though red, distant t. and torrents of rain for two hours. A waterspout in the N.W.
	62	A dry haze.
	63	Very close and sultry.—Midt. to 3 a.m.; constant intensely vivid forked l. of various colours: red, blue, and green, accompanied by a constant roll of heavy t.—Frightful l. after 7 p.m., with very gloomy appearance to the Sd. (wind N.E. b. N. 3).—Rain squalls from N. b. E. occasionally.
5° - 6° N.	64	A vapour like haze over the sky, getting more dense as it approaches the horizon.—Clear over head, but a dense fog or dry mist on horizon.
	65	Much l. in the upper atmosphere.
	68	Dark and heavy looking in the S., with dark electric clouds working up and over-casting the sky. Much l. from S.E. to S.W. without affecting the N.Ely. wind.
	50	Sheet l. in quick succession all round.
	52	Large waterspout astern.
4° - 6° N.	53	Showers with very large globular drops.—A large waterspout inclining to N.N.W., wind N.N.E. 2. Frightful l. and t. with very heavy r. from 8 p.m. to midt.—Constant sheet l. all round.
	54	6 p.m. Rain working round from S.W. to S. and E. came up to us from the Nd. 9 p.m. Much t., all sorts of vivid l.; some of the t. appeared to be just above the mastsheads.—Much forked and sheet l. to the Sd. and distant t.—Several small waterspouts.
	56	Sheet l. in various quarters, mostly in the N.E.
	57	Much l. from S. round by E. to N.
	40	Very loud t. with l.
3° - 4° N.	41	Three attempts to form waterspouts in the E.N.E., the tube acquiring perfect form and getting half down between the cloud and sea, and then gradually dissolving without lifting any water or vapour.—2½ inches of rain fell between 8 p.m. and 8 a.m.—Corposants on royal yardarms and truck.
	42	Much sheet l.
	46	Much sheet l. in the Nd. and Ed.
	30	Three waterspouts in the N.E.
	34	Sheet l. in E. and N. with t.
1° - 2° N.	35	Flash l. in N.
	36	Sheet l. in the E.
	37	Clouds highly charged with l. but no change in wind which was E. b. S. 5; two hours later steady Ely. breeze and cloudy with l.
	38	Very dense black clouds passing over with a few drops of rain.—Weather very unsettled.
0° - 1° N.	10	Scorching hot.
	13	Sheet l. in N.E.
	16	Heavy appearance to S.W.
	19	Slight thunder clouds and flying showers.
	06	Much l.
	07	Passing showers for 10 minutes, then clear.

GENERAL REMARKS.

The following extracts have been made from the "Remarks" in various logs:—
NATURAL HISTORY.

Latitude.	Sub-square.	Remarks on Natural History.
<i>Land Birds and Insects.</i>		
6° to 7° N.	63	A brown and white <i>Butterfly</i> about the ship; also caught a <i>Land Bird</i> , but aquatic, as it is half web-footed: its back is pale lavender, head black, long small-pointed bill like a snipe's, belly and breast white, wings long and pointed like a swallow's.
5° - 6° N.	54	Two or three <i>Butterflies</i> about.
	55	A <i>Land Bird</i> flew on board, and immediately died.
4° - 5° N.	43	A <i>Bird</i> flew on board about the size of one of our sea gulls; back and head dark gray, belly light green, small webbed feet. It looked more like a coaster than an inhabitant of the deep blue sea.
3° - 4° N.	38	Caught a small brown <i>Owl</i> about 10 inches long.
<i>Cetacea.</i>		
3° - 4° N.	32	Three or four <i>Bottle-nosed Whales</i> .
7° - 8° N.	71	<i>Grampus</i> .
4° - 5° N.	44	<i>Grampus</i> .
9° - 10° N.	95	<i>Blackfish</i> playing round the ship.
6° - 7° N.	61	Shoal of <i>Blackfish</i> or <i>Porpoises</i> heading to the N.W.
1° - 2° N.	16	A number of <i>Blackfish</i> .
4° to 8° N.	-	<i>Porpoises</i> were seen in s.-ss. 72,* 64, 54, 40, 44, 48. In 72 they were going S., wind E.
<i>Fish, &c.</i>		
0° - 9° N.	-	<i>Albicore</i> s were seen in s.-ss. 85, 87, 75, 46, 02. In 85 ship surrounded by <i>Albicore</i> s and <i>Bonitos</i> .
0° - 10° N.	-	<i>Bonitos</i> were seen in s.-ss. 95, 85, 87, 75, 50, 51, 46, 28, 02, 06, 09. See above remark on s.-s. 85.
0° - 5° N.	-	<i>Dolphins</i> or <i>Coryphæna</i> were seen in s.-ss. 50, 44, 25, 19, 02, 09.
0° - 10° N.	-	<i>Flying Fish</i> were seen 22 times. Very abundant in s.-ss. 91, 68, 32, and 25. In s.-ss. 64 and 04 they were large; in s.-s. 25 they were very small; in 09 young.
4° - 7° N.	-	<i>Sharks</i> were seen in s.-ss. 64, 65, 51, 44. In 65 there were eight small, in 51 eighteen young.
3° - 5° N.	-	<i>Skipjacks</i> were seen in s.-ss. 43 and 33.
7° - 9° N.	-	<i>Fish</i> (names not given) were seen in s.-ss. 86, 74 (twice). In 74 sea alive with fish of all sorts.
0° - 3° N.	-	<i>Portuguese-men-of-war</i> were seen in s.-ss. 27 and 07. In 27 they were pink and blue.
8° to 9° N.	87	Numerous <i>Molusks</i> floating past, in shape and size like a mushroom.
7° - 8° N.	75	<i>Albicore</i> s, <i>Bonitos</i> , <i>Squid</i> , <i>Flying Fish</i> , and <i>Petrels</i> .
4° - 5° N.	48	<i>Porpoises</i> , <i>Flying Fish</i> , and <i>Medusæ</i> .

* One dot under a sub-square indicates that the creatures were abundant; two that they were very abundant, &c.

Latitude.	Sub-square.	Remarks on Natural History.
<i>Sea Birds.</i>		
0° - 10° N.	-	<i>Stormy Petrels</i> (Mother Carey's Chickens) were seen in 14 sub-squares. They were abundant in s.-ss. 96, 42, and 31. They were most frequently seen between 2° and 3° N.
1° - 2° N.	-	<i>Boobies</i> were seen in s.-s. 15.
0° - 8° N.	-	<i>Birds</i> (supposed to have been Sea Birds) were seen in s.-ss. 71, 74,* 50, 52, 41, 32, 34, 36, 24, 25, 15, 18, 04, 07, 09; in 50 flying south; in 52 and 32, shearwaters; in 04, large and gray, flying to S.E.; in 09, large, flying E.

* One dot under a sub-square indicates that the creatures were abundant; two that they were very abundant, &c.

FALLING STARS.

There are 19 entries of Falling Stars spread over 7 years chiefly between 1855 and 1870; of these 8 were in 1857, 4 in 1858, 2 in both 1855 and 1860, and only 1 in each of the other 3 years.

The following remarks seem worthy of extraction:—

Sub-square.	Hour.	Day.	Year.	Remarks on Falling Stars.
09	a.m.	2nd	1839	Several meteors flying towards the S.
35	2 a.m.	12th	1855	More than a hundred stars shot from the N.E.
16	Midt.	12th	"	A great many stars shooting from E., N.E., and S.E.
51	10 p.m.	10th	1857	Many stars in the vicinity of Orion shooting to the S.W.
42	"	11th	"	Many stars shooting to S.W. from the vicinity of Orion and Aldebaran.
33	"	12th	"	Do. do. do.
95	1 a.m.	2nd	1859	A large meteor fell in the S.W. starting from Orion, it showed all the colours of the rainbow, and then broke into small pieces.
34	Midt.	4th	1860	Stars shooting N.E. and S.E.

TEMPERATURE OF RAIN AND AIR.

Sub-square.	Temperature of Rain.	Temperature of Air.	
76	74.0	79.0	
60	72.9	78.0	
52	73.0	76.0	
53	73.5	78.0	
	77.0	79.5	
	75.0	77.0	
	75.0	78.0	
54	72.0	79.0	
45	76.0	78.0	
31	75.0	76.5	
25	72.5	75.5	
14	74.0	75.3	
	12) 49.9	12) 89.8	
	74.2	77.5	Difference 3°.3

There seems to be a greater difference between the temperature of rain and air in the Nn. than in the Sn. part of the square.

Latitude.	s.-s.	VARIOUS.
8° to 9° N.	86	31st, 1862. Brown dust observed on sails and rigging, wind N.E. by N. 5. Ship from South (same ship as in s.-s. 65).
7° - 8° N.	72	Several small pieces of greenish seaweed (two entries).
6° - 7° N.	61	Noon. Passed a large tree evidently torn up by the roots, it appeared about 40 feet in length.
	65	30th, 1862. A considerable quantity of brown dust has fallen on the sails and rigging, wind N.N.E. Ship from south (same ship as in s.-s. 86).
3° - 4° N.	32	A large stream of something like dirty oil or grease floating on the water.
0° - 1° N.	02	Captain and several of the crew imagined they could smell land and forests very plainly. (The Captain a very good observer.)
	09	St. Paul's rocks to the N.Wd. about 3 miles ; many birds about the ship and rocks.

BEST ROUTES FOR CROSSING THE EQUATOR.

Appendix B. shows that in December the mean force of all winds is very decidedly stronger in the Wn. than in the En. half of Square 39, the difference amounting to nearly three miles an hour of Beaufort's ship. Between 14° and 16° N. the difference amounts to nearly four miles an hour of Beaufort's ship. In that zone the En. half of the square has 15% of calms, whilst there are none in the Wn. half. By comparing the force of wind from various quarters in the several strips it is shown that each wind is stronger to the Wd. than to the Ed. of the Cape Verd Islands.

Appendix B. also shows that there is very much more S.Ely. wind in the Wn. than in the En. half of Square 39, whilst the En. half has an excess of S.Wly. and N.Wly. winds. The following Table will be useful in showing the Navigator the three points in each quarter from which the wind prevails; for instance, he will learn that the N.Ely. wind is very much more Ely. in the Wn. than in the En. half of the square; also that the large amount of S.Ely. wind in the Wn. half is not so southerly as to prevent a ship from making a due S. course; in fact it is generally East.

TABLE 12.

The Direction of the three Prevailing Winds of each quarter of the compass in each half of Square 39. They are in the order of their prevalence. A dash under a letter or figure indicates extreme prevalence.

Latitude.	N. to E. by N., or N.Ely Winds.		E. to S. by E., or S.Ely. Winds.		S. to W. by S., or S.Wly. Winds.		W. to N. by W., or N.Wly. Winds.	
	Wn. half	En. half	Wn. half	En. half	Wn. half	En. half	Wn. half	En. half
	25° to 30° W.	20° to 25° W.	25° to 30° W.	20° to 25° W.	25° to 30° W.	20° to 25° W.	25° to 30° W.	20° to 25° W.
	Points from North.	Points from North.	Points from South.	Points from South.	Points from South.	Points from South.	Points from North.	Points from North.
18° to 20° N.	4, 5, 7	2, 4, 6	8, 7, 6	8, 7, 5	- - -	6, 2, 7	8, 6, -	2, 1, -
16° - 18° N.	7, 5, 6	2, 4, 6	8, 7, 6	4, 6, 8	1, - -	2, 3, 4	4, - -	2, 4, 6
14° - 16° N.	7, 6, 5	2, 4, 3	8, 7, 6	8, 7, -	- - -	- - -	- - -	8, 2, 6
12° - 14° N.	7, 6, 4	2, 4, 3	8, 7, 5	8, 7, -	- - -	- - -	- - -	1, 5, 3
10° - 12° N.	7, 3, 5	2, 4, 3	8, 7, 6	8, 7, 4	- - -	- - -	- - -	1, - -

The accompanying Chart for December, together with Table 2, and the Diagram in the lower right-hand corner of the Chart show that the winds are decidedly stronger and the N.Ely. winds more Ely. on the Wn. than on the En. side of Square 3. The red sections in the current circles, and the arrows on the Diagram of sea isotherms, which show the prevailing current, indicate that with the Sn. progress of the N.E.

K k

Trade a light Wly. current has appeared in the Nn. part of the square, whilst a stronger Wly. current still prevails between 0° and 4° N.; between these, from 4° to 6° N., an Ely. current still exists, but chiefly on the En. side of the square.

Appendix C. shows that in December the prevailing wind of Square 303 is about two points more Ely. between 33° and 35° W. than between 30° and 33° W. The comparison is best made by running a pencil line down each Table, and making it pass through the largest percentage in each degree of latitude. The mean direction of the largest percentages is S.E. by E. in the Eastern, and E. by S. in the Western part of the square.

By comparing the mean forces it is shown that from the Equator to 2° S. the winds are stronger in the Wn. than in the En. part of the square, but from 2° to 10° S. they are very much stronger in its En. than in its Wn. part. The mean force of the 10 strips in each part shows that Beaufort's ship would pass through the En. part at the rate of 1 or $1\frac{1}{2}$ miles per hour faster than through the Wn. part.

From the above facts it seems right that the *Outward-bound* ship should most decidedly pass to the Wd. of the Cape Verd Islands, and stand boldly to the Sd. through Square 3 in about 25° W., taking the tack which gives the most Southing when the Sly. wind sets in. The ship "Bowfell," of Liverpool, Capt. Balderston, passed three miles to windward of St. Paul's Rocks, at 3 p.m. December 22nd, 1869; she was in $0^{\circ} 39' S.$, $31^{\circ} 16' W.$ on the 23rd; $3^{\circ} 44' S.$, $32^{\circ} 31' W.$ on the 24th; $7^{\circ} 16' S.$, $33^{\circ} 30' W.$ on the 25th; $10^{\circ} 19' S.$, $34^{\circ} 31' W.$ on the 26th. She had a Wly. current of about 30 miles in 24 hours near the Equator, which became more S.Wly. and weaker as she proceeded to the Sd. The wind was generally S.E. by E., the weather fine, and sea moderate S.Ely. In Square 303 the wind is more Ely. (though lighter) near the land than it is between 30° and 33° W., so that a more Wly. crossing than that of the "Bowfell" need not be much feared in December.

The *Homeward-bound* ship should cross the Equator to the Westward of 25° W. and stand to the Northward through the Doldrums, for both Squares 3 and 39 have the strongest and most favourable winds in their Western halves. If she is driven to pass through Square 303 she should keep as much on the Eastern side of that square as possible until she has passed the parallel of 2° S., so as to avoid the comparatively light winds which exist near the coast of South America.

CONCLUSION.

In conclusion it seems necessary to say that the nature of the work requires a good deal of repetition, because the Navigator will frequently only consult the data of the month in which he is interested, which necessitates that each month should, to a certain extent, be complete in itself.

Necessity
for a certain
amount of
repetition.

In giving suggestions as to the Best Routes across the Equator, the courses have been planned on the idea that the Navigator will steer North or South through the zone of least wind-force, when the direction of the wind permits; by this means he will be the shortest time possible in the Doldrums, which would not be the case if he attempted to make Easting or Westing in them at a time when the direction of the wind permitted a North or South course.

Best Routes
across the
Equator.

It has been remarked by those who have merely seen the Diagrams, which only give the *prevailing* wind in each 2° square, that the chaos of the Doldrums has been converted into two systems of steady wind, but the Chart which shows all the winds that have been known to blow in the month proves the error of this idea; still the prevailing wind arrows do show how in each zone the influence of one Trade is felt more decidedly than that of the other, and the comparison of one month with another shows how one Trade is always advancing whilst the other is receding before it, but not without a great struggle and tangle of confusion in both air and sea.

Wind.

This Paper seems to support the theory that the Trade winds draw most of their air from areas of high pressure over the sea, at their polar edges. (See Barometer Manual,* Plate III.) As a proof of this, Square 3 is found to be favourably placed for receiving the full effect of the S.E. Trade, for that Trade's area of high pressure is to the S.Eastward of the square, whilst that of the N.E. Trade is to the N.Westward of it. Africa seems to prevent the Eastern side of Square 3 from getting the full force of the N.E. Trade, but on the western side of the ocean, it extends very far South of the square; for instance, parts of South America in 3° or 4° S. have a prevailing N.Easterly wind during the strength of the N.E. Trade, when S.Ely. winds extend to 2° N. in Square 3, and at the same time the whole Eastern side of the square is experiencing only light Northerly and North-westerly winds, which seem to be a kind of eddy or indraught of the N.E. Trade round the West Coast of Africa. The tendency in the wind to be drawn towards heated land seems to be shown by the prevalence of Easterly winds in the Doldrums during the Southern summer, when the sun is vertical over South America, which is the land nearest to the South-Western corner of Square 3; and of Westerly winds in the Northern summer, when the sun is vertical over North Africa, which is the land nearest to the North-Eastern corner of the square.

* Barometer Manual, Board of Trade. London, Stanford. 1871.

In the neighbourhood of the Equator, the wind seems to blow almost directly from a high towards a low pressure, but in the Northern part of Square 3, when the back is turned to the wind, the lowest pressure does not seem to be quite facing the observer, but lies a little towards his left hand. This is well shown by the isobars and the gradual curve of the prevailing winds in July and the following months; see the Diagrams on the respective Charts. The high pressure which is shown to advance into the square from the Southward during the Northern summer months seems to supply air, which, on passing North, may help to form the West India hurricanes. Mr. Meldrum finds that the Mauritius hurricanes are formed in an area of low between two areas of high pressure, and the same circumstances seem to cause the winter gales off the East coast of North America. (See the Report on the "City of Boston" gale.)*

When the wind is blowing with a force of 3 or 4 of Beaufort's scale in Square 3, there seems to be a gradient of about .01 of an inch of the barometer for every 50 miles.

The Direction and Force of the Prevailing Winds in each zone, considered in connection with the direction, force, and veering of the squalls experienced there, may help us to understand their cause. From a study of this *constant* meeting of opposing currents of air and its effect on weather, it is hoped that the Meteorologist may deduce facts which will be useful in dealing with the weather of the temperate zone, where the meeting of counter currents is only occasional.

Lightning.

The arrows showing the prevailing wind in each 2° square, and the Tables of each month numbered 1, giving the percentage of wind from each quarter, for each degree of latitude, show the zone in which the Trade winds meet. The Tables of each month numbered 9, as well as those numbered 11, which latter give the bearings on which lightning was seen, show that this zone is generally the source of most Lightning.

Clouds.

The Tables of each month numbered 8 seem to show that the Clouds of one Trade pass over the Equatorial edge of the other; for instance, "Upper Clouds from S.E., wind N.E.," and *vice versa*, are very common entries. They also show that in August and September the percentage of upper clouds from some Northern quarter (N.E. or N.W.) exceeds that of those from some Southern quarter (S.E. or S.W.), especially in August, but that in all other months those from S.E. or S.W. prevail, especially in November, January, and February; so that the upper current of air seems to flow most freely towards the North, except in August and September.

Currents.

The relation of the Currents of Water to the Prevailing Winds is well shown; also that their direction is made more Westerly than it would be if they were not the result of opposing winds, for the meeting of the Trades tends to heap up the water, so that instead of flowing N.W. or S.W. as their respective Trades would drive them, they are diverted to the Westward; from this heaped-up water there is also a back drift to the Eastward into the Gulf of Guinea, to replace the water drawn to the Westward, away from the coast of Africa, by the prevailing winds.

* A Discussion of the Meteorology of the Atlantic lying North of 30° N. London, Stanford. 1872.

The Temperatures of Air and Surface Water are shown to agree in a remarkable way, the mean temperature of the sea being generally about 1° F. higher than that of the air. A similar difference was found to exist off the West Coast of South America.*

The Difference between the readings of Dry and Damp Bulbs is found to be least in the neighbourhood of the Doldrums, and to increase as you pass to the Northward or Southward of them; but during the Southern winter, when cold water is brought North of the Equator by the Equatorial current, there is a slight decrease in the difference as ships pass from the Northward into the cold water, even though there is very little cloud and no rain there; this decrease is no doubt the effect of the larger amount of moisture condensed in the air over the cooler water, for the amount of "dew" also greatly increases.

The variations in the Specific Gravity of the Sea seem to depend on the position of the zone of most rain and least wind, as the lowest readings are generally found there.

The way in which one kind of observation bears out another is frequently shown; for instance, in October and November the N.Eastern corner of the square is exceptionally hot, and shows a great difference between the dry and damp bulbs; the General Remarks show that land birds and insects are very abundant there, also that there is sometimes a strong smell of land, though it is 250 miles distant: at the same time the prevailing wind is from the land. Again, in July and the following months the temperature of the sea is very uniform between 10° and 4° N., whilst between 4° N. and the Equator there is a decrease of 4° F.: this depends on the direction of the current, for its observations show that between 10° and 4° N. it is Easterly, but between 4° and 0° N. it is strong Westerly; now the Easterly current is composed of water which has been exposed to the Northern summer, whilst that of the Westerly current has been under the influence of the Southern winter.

In the letter-press for each month attention has been called to anything of apparent importance, which renders it unnecessary to extend these concluding remarks, and it is hoped that this Paper will help the Navigator to select the best route across the Equator, and the Meteorologist to understand better the intricate workings of Air, Sea, and Weather over a part of the ocean where two Trade winds meet.

* Contributions to our Knowledge of the Meteorology of Cape Horn and the West Coast of South America, p. 17. London, Stanford. 1871.

Tempera-
tures.Difference
between Dry
and Damp
Bulbs.Specific
Gravity.Relation of
one kind of
observation
to another.

APPENDIX.

APPENDIX A.

DIURNAL RANGE of ATMOSPHERICAL PRESSURE, AIR and SEA TEMPERATURES in
the NORTHERN and SOUTHERN HALVES of SQUARE 3, for each MONTH and for
the YEAR.

In the following discussion a selection has been made of the best registers used in the general discussion of Square 3, in which the observations were recorded at the 4-hourly intervals, viz., 4 a.m., 8 a.m., Noon, 4 p.m., 8 p.m., and Midnight. The period over which the observations extend is chiefly between 1855 and 1870.

The investigation is a continuation (on a larger scale) of the work undertaken in the year 1861 by Admiral FitzRoy (Seventh Number of Meteorological Papers).

The regularity with which the Diurnal Range of Pressure and Temperature takes place in the Atlantic near the Equator, is considered a matter of great interest, and it is hoped that the observations are sufficiently numerous to give trustworthy results. About 10,300 observations have been used for Atmospheric Pressure, 9,600 for Air Temperature, and 6,600 for Sea Temperature.

The monthly means of the 4-hourly periods have been deduced, and from them the constants of Bessel's formula in the periodical expression for the diurnal variations (Tables I.), from which constants the most probable values have been calculated for each hour of the day (Tables II.), as well as the various maxima and minima (Tables III.), for each month and for the year. These results have been deduced for both the northern and southern halves of Square 3.

Four places of decimals have been used in calculating the 4-hourly means of barometer, and two places for temperature. It has not been thought necessary to give more than three places for barometer and one for temperature in the published hourly values, it being supposed that the use of more figures would be an unnecessary refinement for observations taken on board ship. The means of the 4-hourly periods agree exactly with the computed values for the respective hours given in the tables.

The law of periodic variation is represented by the following expression:—

$$E = A + B_1 \sin(\theta + C_1) + B_2 \sin(2\theta + C_2) + B_3 \sin(3\theta + C_3),$$

in the present discussion E represents the value of pressure or temperature at any time of the civil day corresponding to θ , reckoned in arc, commencing at midnight. A represents the mean monthly value for atmospheric pressure or temperature, but in calculating the range, $A = 0$ invariably; B_1 , C_1 , &c. are the constants determined from the 4-hourly means. The development has been carried to the final term of the formula.

The formula used in obtaining the value of the final constants (B_3 and C_3) is one developed by Professor J. R. Eastman, U.S.N., in the discussion of the observations taken at the United States

Naval Observatory, 1842-1866 (see Appendix I. to the volume of Astronomical and Meteorological Observations made at that Observatory during the year 1866, Washington, 1868), and already adopted by this Office in calculating the Diurnal Range in the Antarctic Regions. (See No. 18 of official publications.)

During the progress of the work many useful hints have been obtained from Dr. C. Jelinek's Paper, "Ueber den täglichen Gang der vorzüglichsten meteorologischen Elemente, aus den stündlichen Beobachtungen der Prager Sternwarte abgeleitet," Vienna 1850, and also from Professor E. Plantamour's Paper, "Résumé des Observations Thermométriques et Barométriques faites à l'Observatoire de Genève et au Grand St. Bernard pendant les dix années 1841 à 1850"; Geneva, 1851, as well as from Mr. G. Harvey Simmonds, formerly in the Meteorological Department of the Board of Trade.

There is a source of error which it is difficult to eliminate, viz., the effect of a ship's speed on the readings of a barometer or thermometer. For instance, in the case of the barometer, on turning to the small Diagram of isobars given in the lower right-hand corner of the Chart for January, it will be seen that the lines of equal barometer are pretty close in the Nn. part of the square, where there is a fresh N.Ely. wind; now suppose that a ship going fast to the Sd. with this N.Ely. wind takes a reading of the barometer at 4 a.m. and again at noon, if there were no diurnal range the barometer at noon would be lower than at 4 a.m., because of the ship travelling from a higher to a lower pressure, but on account of the diurnal range the barometer is higher at noon than at 4 a.m., though not so much higher as it would have been had she stood still, the difference being the effect of the ship's speed. As the isobars are closest where the wind is strongest, and in the same place ships can sail fastest, it is plain that this error is greatest with ships having strong fair winds, when their courses are at right angles to the direction of the isobars.

The effect of a ship's progress is often very considerable on the temperature of air and sea, especially the latter, since the diurnal range of sea is often exceedingly small compared with the change in temperature due to the change of the ship's position. Great care has been taken to eliminate as far as possible this source of error by using an equal number of outward-bound and homeward-bound observations.

In the Introductory Remarks on p. 1, it will be seen that the hours used in the *general* discussion of the various data are not those specially suited for giving absolutely correct means, but Diagram 1 shows that the means are sufficiently correct for all practical purposes.

The upper part of Diagram 1 is a representation of Square 3 sub-divided into twenty-five 2° squares. In each of these smaller squares are given for the month of January—

- 1st. The Mean Day of the Month on which the observations were taken.
- 2nd. The Mean of the Barometer readings *uncorrected* for diurnal range, obtained from observations at the various hours mentioned on p. 1, afforded by all ships passing through the Square in January.
- 3rd. The correction for Diurnal Range, obtained by summing the corrections due to range for the various hours of observation.
- 4th. The Mean of the Barometer readings *corrected* for diurnal range.

The *thin lines* traversing the square show the isobars of equal barometer when uncorrected for diurnal range.

The *thick lines* are the isobars after applying the correction for diurnal range.

The lower part of Diagram 1 contains the *corrected* and *uncorrected* isotherms of the Air Temperature for the month of January.

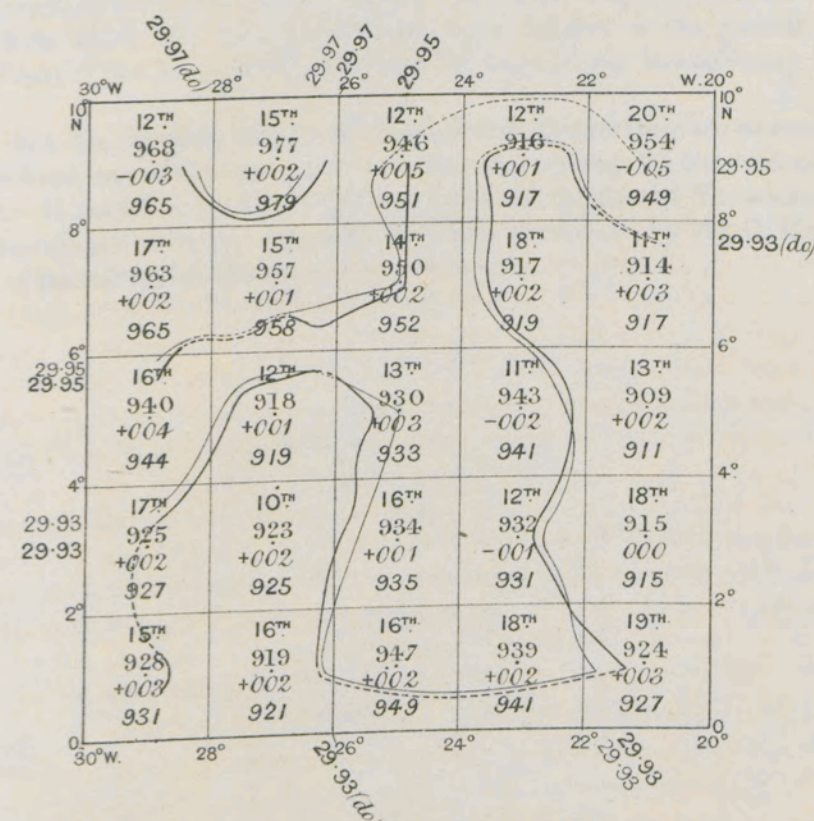
ISOBARS FOR EACH .02 OF AN INCH.

The figures showing the resulting mean day of month corresponding to mean barom. thus 12th

The figures and isobars *uncorrected* for diurnal range shown thus 968

The figures showing the correction due for diurnal range thus .003

The figures and isobars *corrected* for diurnal range thus 965

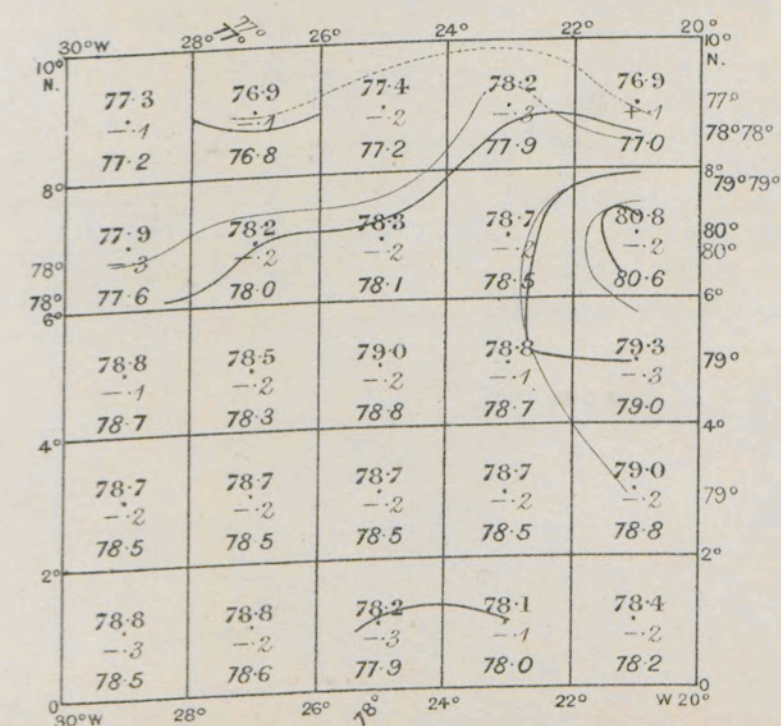


ISOTHERMS OF AIR FOR EACH DEGREE FAHRENHEIT.

The figures and isotherms *uncorrected* for diurnal range shown thus 77.9

The figures showing the correction due for diurnal range thus .3

The figures and isotherms *corrected* for diurnal range thus 77.6



Note. The centre of each square is shown by a black dot.

A comparison of these isobars and isotherms shows that for all practical purposes it is not necessary to correct the observations for diurnal range. Hence the diurnal range is given but not applied to the observations from which the mean results have been deduced in the general discussion of Square 3. In the case of Sea Temperature, correction for range is even less necessary than it is with the air.

It is also found that the Monthly Changes of Pressure and Temperature are so small in Square 3 that it is not considered requisite to apply any correction for reducing the observations to the Mean Day of the Month. It has not been thought desirable to discuss the Annual Variations.

The whole of the calculations in this Appendix have been carried out by Mr. C. Harding assisted by other members of the staff of the Office.

Month	Day	Time	Pressure	Temperature	Humidity	Wind	Cloud
Jan	1	0800	101.5	55.0	75.0	1.0	0.0
Jan	1	1200	101.5	55.0	75.0	1.0	0.0
Jan	1	1600	101.5	55.0	75.0	1.0	0.0
Jan	1	2000	101.5	55.0	75.0	1.0	0.0
Jan	2	0800	101.5	55.0	75.0	1.0	0.0
Jan	2	1200	101.5	55.0	75.0	1.0	0.0
Jan	2	1600	101.5	55.0	75.0	1.0	0.0
Jan	2	2000	101.5	55.0	75.0	1.0	0.0
Jan	3	0800	101.5	55.0	75.0	1.0	0.0
Jan	3	1200	101.5	55.0	75.0	1.0	0.0
Jan	3	1600	101.5	55.0	75.0	1.0	0.0
Jan	3	2000	101.5	55.0	75.0	1.0	0.0
Jan	4	0800	101.5	55.0	75.0	1.0	0.0
Jan	4	1200	101.5	55.0	75.0	1.0	0.0
Jan	4	1600	101.5	55.0	75.0	1.0	0.0
Jan	4	2000	101.5	55.0	75.0	1.0	0.0
Jan	5	0800	101.5	55.0	75.0	1.0	0.0
Jan	5	1200	101.5	55.0	75.0	1.0	0.0
Jan	5	1600	101.5	55.0	75.0	1.0	0.0
Jan	5	2000	101.5	55.0	75.0	1.0	0.0
Jan	6	0800	101.5	55.0	75.0	1.0	0.0
Jan	6	1200	101.5	55.0	75.0	1.0	0.0
Jan	6	1600	101.5	55.0	75.0	1.0	0.0
Jan	6	2000	101.5	55.0	75.0	1.0	0.0
Jan	7	0800	101.5	55.0	75.0	1.0	0.0
Jan	7	1200	101.5	55.0	75.0	1.0	0.0
Jan	7	1600	101.5	55.0	75.0	1.0	0.0
Jan	7	2000	101.5	55.0	75.0	1.0	0.0
Jan	8	0800	101.5	55.0	75.0	1.0	0.0
Jan	8	1200	101.5	55.0	75.0	1.0	0.0
Jan	8	1600	101.5	55.0	75.0	1.0	0.0
Jan	8	2000	101.5	55.0	75.0	1.0	0.0
Jan	9	0800	101.5	55.0	75.0	1.0	0.0
Jan	9	1200	101.5	55.0	75.0	1.0	0.0
Jan	9	1600	101.5	55.0	75.0	1.0	0.0
Jan	9	2000	101.5	55.0	75.0	1.0	0.0
Jan	10	0800	101.5	55.0	75.0	1.0	0.0
Jan	10	1200	101.5	55.0	75.0	1.0	0.0
Jan	10	1600	101.5	55.0	75.0	1.0	0.0
Jan	10	2000	101.5	55.0	75.0	1.0	0.0
Jan	11	0800	101.5	55.0	75.0	1.0	0.0
Jan	11	1200	101.5	55.0	75.0	1.0	0.0
Jan	11	1600	101.5	55.0	75.0	1.0	0.0
Jan	11	2000	101.5	55.0	75.0	1.0	0.0
Jan	12	0800	101.5	55.0	75.0	1.0	0.0
Jan	12	1200	101.5	55.0	75.0	1.0	0.0
Jan	12	1600	101.5	55.0	75.0	1.0	0.0
Jan	12	2000	101.5	55.0	75.0	1.0	0.0

TABLE I.—BAROMETER.

SQUARE 3.—NORTHERN HALF.

Lat. 5° to 10° N. Long. 20° to 30° W.

VALUES of the CONSTANTS in the PERIODICAL EXPRESSION for the DIURNAL VARIATIONS of ATMOSPHERIC PRESSURE.

Months.	No. of Days.	A.	B ₁ .	C ₁ .	B ₂ .	C ₂ .	B ₃ .	C ₃ .
		ins.	in.	° /	in.	° /	in.	°
January - -	47	29·9442	0·0095	28 15	0·0366	166 2	0·0025	90
February - -	48	29·9484	0·0057	34 54	0·0319	167 39	0·0022	90
March - - -	60	29·9566	0·0104	8 33	0·0323	163 52	0·0005	90
April - - -	47	29·9466	0·0066	316 35	0·0355	154 37	0·0003	90
May - - -	67	29·9671	0·0046	306 6	0·0332	152 57	0·0015	90
June - - -	100	29·9944	0·0037	314 39	0·0296	154 4	0·0009	90
July - - -	98	30·0079	0·0025	349 7	0·0282	151 38	0·0013	90
August - - -	45	29·9916	0·0059	348 16	0·0270	158 59	0·0001	90
September - -	80	29·9820	0·0050	331 20	0·0306	155 48	0·0010	90
October - - -	89	29·9529	0·0052	350 25	0·0300	161 9	0·0005	90
November - -	94	29·9377	0·0048	5 47	0·0350	159 52	0·0007	90
December - -	51	29·9369	0·0102	0 17	0·0341	165 9	0·0015	90
Year -	826	29·9634	0·0055	354 51	0·0319	159 26	0·0011	90

TABLE I.—BAROMETER.

SQUARE 3.—SOUTHERN HALF.

Lat. 0° to 5° N. Long. 20° to 30° W.

VALUES of the CONSTANTS in the PERIODICAL EXPRESSION for the DIURNAL VARIATIONS of ATMOSPHERIC PRESSURE.

Months.	No. of Days.	A.	B ₁ .	C ₁ .	B ₂ .	C ₂ .	B ₃ .	C ₃ .
		ins.	in.	° /	in.	° /	in.	°
January - -	101	29·9273	0·0067	34 57	0·0353	163 15	0·0017	90
February - -	82	29·9375	0·0079	10 54	0·0334	164 57	0·0010	90
March - - -	106	29·9163	0·0063	354 26	0·0343	158 48	0·0011	90
April - - -	101	29·9319	0·0069	341 3	0·0353	158 13	0·0000	90
May - - -	82	29·9382	0·0056	348 53	0·0336	153 57	0·0005	90
June - - -	52	29·9895	0·0035	316 6	0·0289	150 14	0·0002	90
July - - -	65	30·0409	0·0092	348 30	0·0278	151 51	0·0004	90
August - - -	63	30·0145	0·0100	358 6	0·0299	155 39	0·0007	90
September - -	63	30·0059	0·0078	0 8	0·0312	158 12	0·0001	90
October - - -	58	29·9600	0·0052	11 58	0·0304	161 30	0·0001	90
November - -	72	29·9367	0·0062	13 56	0·0345	157 39	0·0014	90
December - -	45	29·9213	0·0070	25 44	0·0340	160 40	0·0014	90
Year -	890	29·9600	0·0065	1 45	0·0323	158 4	0·0005	90

TABLE II.—BAROMETER.

SQUARE 3.—NORTHERN HALF.
Lat. 5° to 10° N. Long. 20° to 30° W.

DIURNAL RANGE of ATMOSPHERIC PRESSURE for EVERY HOUR.

Hour.	Jan.	Feb.	March.	April.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.	Year.
	ins. 29·944	ins. 29·948	ins. 29·957	ins. 29·947	ins. 29·967	ins. 29·994	ins. 30·008	ins. 29·992	ins. 29·982	ins. 29·953	ins. 29·938	ins. 29·937	ins. 29·963
1 a.m.	-·002	-·004	-·003	-·006	-·004	-·003	·000	-·004	-·004	-·005	-·004	-·005	-·004
2 "	-·018	-·018	-·016	-·022	-·020	-·018	-·014	-·015	-·018	-·018	-·020	-·019	-·018
3 "	-·028	-·027	-·023	-·032	-·031	-·027	-·024	-·022	-·027	-·026	-·030	-·027	-·027
4 "	-·028	-·027	-·022	-·034	-·034	-·030	-·028	-·022	-·029	-·026	-·031	-·026	-·028
5 "	-·018	-·018	-·013	-·026	-·027	-·023	-·023	-·016	-·022	-·018	-·023	-·015	-·020
6 "	·000	-·002	+·001	-·010	-·012	-·010	-·011	-·004	-·008	-·005	-·007	+·001	-·006
7 "	+·019	+·015	+·018	+·009	+·006	+·006	+·004	+·010	+·009	+·011	+·011	+·020	+·011
8 "	+·034	+·028	+·031	+·027	+·024	+·021	+·019	+·023	+·024	+·025	+·027	+·034	+·026
9 "	+·040	+·034	+·038	+·039	+·035	+·031	+·028	+·030	+·033	+·033	+·036	+·041	+·035
10 "	+·035	+·030	+·035	+·042	+·038	+·033	+·030	+·031	+·035	+·033	+·036	+·038	+·035
11 "	+·021	+·018	+·024	+·035	+·031	+·027	+·024	+·024	+·028	+·024	+·027	+·026	+·026
Noon	+·002	+·001	+·007	+·019	+·017	+·015	+·013	+·011	+·014	+·010	+·011	+·007	+·011
1 p.m.	-·018	-·016	-·012	·000	·000	-·001	-·002	-·005	-·003	-·007	-·008	-·013	-·007
2 "	-·034	-·029	-·029	-·019	-·016	-·016	-·016	-·019	-·018	-·022	-·025	-·029	-·023
3 "	-·043	-·035	-·039	-·032	-·028	-·026	-·025	-·028	-·029	-·031	-·036	-·039	-·033
4 "	-·042	-·034	-·041	-·037	-·032	-·030	-·029	-·031	-·032	-·033	-·038	-·040	-·035
5 "	-·033	-·025	-·033	-·032	-·028	-·026	-·025	-·026	-·028	-·027	-·031	-·033	-·029
6 "	-·017	-·012	-·019	-·020	-·018	-·016	-·016	-·015	-·017	-·015	-·017	-·019	-·017
7 "	+·001	+·004	-·002	-·003	-·003	-·002	-·003	-·002	-·002	·000	+·001	-·002	-·001
8 "	+·019	+·019	+·014	+·013	+·012	+·012	+·011	+·011	+·012	+·014	+·018	+·014	+·014
9 "	+·031	+·029	+·024	+·025	+·024	+·022	+·022	+·020	+·022	+·024	+·029	+·025	+·025
10 "	+·035	+·031	+·028	+·029	+·029	+·026	+·027	+·023	+·026	+·026	+·033	+·028	+·028
11 "	+·029	+·025	+·022	+·024	+·025	+·022	+·024	+·018	+·022	+·021	+·027	+·023	+·023
Midnight	+·016	+·012	+·011	+·011	+·013	+·011	+·014	+·009	+·011	+·009	+·013	+·010	+·012

The figures at the head of each column are the Mean Monthly Values. By combining these with
The values in this Table are the same as those

TABLE II.—BAROMETER.

SQUARE 3.—SOUTHERN HALF.
Lat. 0° to 5° N. Long. 20° to 30° W.

DIURNAL RANGE of ATMOSPHERIC PRESSURE for EVERY HOUR.

Hour.	Jan.	Feb.	March.	April.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.	Year.
	ins. 29·927	ins. 29·938	ins. 29·916	ins. 29·932	ins. 29·938	ins. 29·990	ins. 30·041	ins. 30·014	ins. 30·006	ins. 29·960	ins. 29·937	ins. 29·921	ins. 29·960
1 a.m.	-·002	-·004	-·003	-·006	-·002	-·002	-·001	-·001	-·002	-·004	-·001	-·001	-·002
2 "	-·018	-·018	-·019	-·021	-·017	-·015	-·012	-·013	-·015	-·017	-·017	-·016	-·016
3 "	-·028	-·026	-·029	-·030	-·027	-·025	-·019	-·020	-·024	-·025	-·028	-·026	-·026
4 "	-·029	-·026	-·030	-·030	-·030	-·028	-·021	-·021	-·024	-·025	-·030	-·028	-·027
5 "	-·021	-·016	-·022	-·022	-·023	-·023	-·015	-·014	-·017	-·018	-·022	-·020	-·019
6 "	-·005	-·001	-·006	-·007	-·009	-·012	-·004	-·002	-·004	-·005	-·007	-·005	-·006
7 "	+·014	+·016	+·012	+·012	+·008	+·003	+·010	+·012	+·012	+·011	+·011	+·013	+·011
8 "	+·029	+·031	+·028	+·029	+·025	+·018	+·023	+·026	+·026	+·024	+·027	+·027	+·026
9 "	+·036	+·037	+·038	+·039	+·035	+·028	+·032	+·034	+·035	+·032	+·036	+·035	+·035
10 "	+·034	+·035	+·038	+·040	+·037	+·032	+·034	+·035	+·035	+·031	+·036	+·034	+·035
11 "	+·022	+·023	+·028	+·032	+·030	+·028	+·028	+·028	+·026	+·023	+·026	+·024	+·027
Noon	+·005	+·006	+·012	+·015	+·015	+·017	+·015	+·013	+·011	+·008	+·010	+·007	+·011
1 p.m.	-·014	-·013	-·007	-·005	-·003	+·002	-·001	-·005	-·007	-·009	-·009	-·012	-·007
2 "	-·030	-·029	-·024	-·023	-·021	-·014	-·018	-·022	-·023	-·024	-·025	-·028	-·023
3 "	-·039	-·038	-·035	-·036	-·033	-·025	-·030	-·035	-·034	-·033	-·036	-·038	-·034
4 "	-·039	-·039	-·038	-·040	-·037	-·030	-·035	-·039	-·037	-·035	-·039	-·039	-·037
5 "	-·031	-·031	-·032	-·034	-·032	-·027	-·032	-·034	-·032	-·028	-·032	-·032	-·031
6 "	-·016	-·016	-·019	-·020	-·020	-·017	-·022	-·022	-·019	-·015	-·019	-·018	-·019
7 "	+·003	+·001	-·002	-·002	-·004	-·003	-·008	-·006	-·003	+·001	-·002	·000	-·002
8 "	+·020	+·017	+·015	+·015	+·013	+·011	+·006	+·009	+·012	+·016	+·015	+·017	+·014
9 "	+·031	+·027	+·026	+·027	+·025	+·022	+·017	+·020	+·023	+·026	+·028	+·029	+·025
10 "	+·035	+·030	+·030	+·030	+·030	+·026	+·022	+·024	+·027	+·028	+·032	+·033	+·029
11 "	+·029	+·024	+·025	+·024	+·026	+·022	+·019	+·021	+·023	+·023	+·028	+·028	+·024
Midnight	+·016	+·011	+·013	+·011	+·014	+·012	+·011	+·011	+·012	+·011	+·016	+·016	+·013

the amount of range at any hour, the reading of the barometer for that hour can be obtained.
shown by the barometer curves on Diagrams 2 and 3.

TABLE III.—BAROMETER.

SQUARE 3.—NORTHERN HALF.

Lat. 5° to 10° N. Long. 20° to 30° W.

TIMES of the MAXIMA and MINIMA ATMOSPHERIC PRESSURES and their corresponding Differences from the Daily Mean.

Month.	Morning Minimum.		Morning Maximum.		Afternoon Minimum.		Afternoon Maximum.		Extent of Diurnal Range.
	Time.	Difference.	Time.	Difference.	Time.	Difference.	Time.	Difference.	
	h. m.	in.	h. m.	in.	h. m.	in.	h. m.	in.	in.
January -	3 30	—'030	9 5	+ '040	3 25	—'044	9 55	+ '035	·084
February -	3 29	—'028	9 5	+ '034	3 20	—'036	9 47	+ '031	·070
March -	3 24	—'024	9 15	+ '038	3 40	—'041	9 52	+ '028	·079
April -	3 41	—'034	9 47	+ '042	4 1	—'037	9 55	+ '029	·079
May -	3 47	—'034	9 46	+ '038	4 2	—'032	10 3	+ '029	·072
June -	3 46	—'030	9 45	+ '033	3 59	—'030	9 59	+ '026	·063
July -	3 54	—'028	9 45	+ '030	4 0	—'029	10 9	+ '027	·059
August -	3 33	—'023	9 33	+ '031	3 51	—'031	9 52	+ '023	·062
September	3 41	—'029	9 39	+ '035	3 56	—'032	9 59	+ '026	·067
October -	3 32	—'027	9 28	+ '034	3 44	—'033	9 48	+ '026	·067
November	3 37	—'032	9 30	+ '038	3 43	—'038	9 51	+ '033	·076
December	3 23	—'027	9 11	+ '041	3 38	—'041	9 52	+ '028	·082
Year -	3 36	—'029	9 28	+ '036	3 46	—'035	9 55	+ '028	·071

The times of the maxima and minima throughout the year vary as follows:—

Morning minimum between 3 23 a.m. in December and 3 54 a.m. in July = 31 minutes range.
 Morning maximum between 9 5 a.m. in { January } and 9 47 a.m. in April = 42 " "
 Afternoon minimum between 3 20 p.m. in February and 4 2 p.m. in May = 42 " "
 Afternoon maximum between 9 47 p.m. in February and 10 9 p.m. in July = 22 " "

It will be seen that the range in time is considerably greater in the day maxima and minima than in those for the night, it is also shown that during the year the values of the day maxima and minima are in excess of those for the night, except in May and June, the day minimum for May being slightly in defect and that for June equal to the night minimum.

For the whole year:—

The morning maximum exceeds the afternoon maximum by ·008 in.

The afternoon minimum exceeds the morning minimum by ·006 in.

The extent of diurnal range is largest from November to April.

The greatest extent of range in any one month is ·084 in., in January; the least, ·059 in., in July.

The values of the various maxima and minima are most nearly alike in July.

TABLE III.—BAROMETER.

SQUARE 3.—SOUTHERN HALF.

Lat. 0° to 5° N. Long. 20° to 30° W.

TIMES of the MAXIMA and MINIMA ATMOSPHERIC PRESSURES and their corresponding Differences from the Daily Mean.

Month.	Morning Minimum.		Morning Maximum.		Afternoon Minimum.		Afternoon Maximum.		Extent of Diurnal Range.
	Time.	Difference.	Time.	Difference,	Time.	Difference.	Time.	Difference.	
	h. m.	in.	h. m.	in.	h. m.	in.	h. m.	in.	in.
January -	3 36	—'030	9 16	+ '036	3 31	—'040	9 53	+ '035	·076
February -	3 26	—'027	9 14	+ '038	3 34	—'040	9 48	+ '030	·078
March -	3 37	—'031	9 30	+ '039	3 48	—'038	9 56	+ '030	·077
April -	3 34	—'031	9 37	+ '041	3 52	—'040	9 51	+ '030	·081
May -	3 46	—'030	9 45	+ '038	3 58	—'037	10 2	+ '030	·075
June -	3 53	—'028	9 59	+ '032	4 6	—'030	10 0	+ '026	·062
July -	3 42	—'021	9 46	+ '034	4 8	—'035	10 8	+ '022	·069
August -	3 36	—'021	9 37	+ '036	3 59	—'039	10 1	+ '024	·075
September	3 35	—'025	9 31	+ '036	3 51	—'038	9 57	+ '027	·074
October -	3 33	—'026	9 28	+ '033	3 41	—'035	9 47	+ '028	·068
November	3 43	—'030	9 29	+ '037	3 47	—'039	10 2	+ '032	·076
December	3 39	—'028	9 21	+ '036	3 39	—'040	9 57	+ '033	·076
Year -	3 38	—'027	9 32	+ '036	3 49	—'037	9 57	+ '029	·073

The times of the maxima and minima throughout the year vary as follows:—

Morning minimum between 3 26 a.m. in February and 3 53 a.m. in June = 27 minutes range.
 Morning maximum between 9 14 a.m. in February and 9 59 a.m. in June = 45 " "
 Afternoon minimum between 3 31 p.m. in January and 4 8 p.m. in July = 37 " "
 Afternoon maximum between 9 47 p.m. in October* and 10 8 p.m. in July = 21 " "

As shown in the Northern half the range in time is considerably greater in the day maxima and minima than in those for the night, it is also shown that throughout the year the values of the day maxima and minima are in excess of those for the night.

For the whole year:—

The morning maximum exceeds the afternoon maximum by ·007 in.

The afternoon minimum exceeds the morning minimum by ·010 in.

The extent of diurnal range is largest from November to April.

The greatest extent of range in any one month is ·081 in., in April; the least, ·062 in., in June.

The values of the various maxima and minima are most nearly alike in June.

* February has its afternoon maximum at 9.48 p.m.

TABLE IV.—BAROMETER.

SQUARE 3.—NORTHERN HALF.
Lat. 5° to 10° N. Long. 20° to 30° W.

TIMES at which the ATMOSPHERIC PRESSURE is at its MEAN DAILY VALUE.

Month.	Pressure decreasing.	Pressure increasing.	Pressure decreasing.	Pressure increasing.
	h. m.	h. m.	h. m.	h. m.
January - -	o 54 a.m.	6 1 a.m.	o 5 p.m.	6 55 p.m.
February - -	o 46 "	6 7 "	o 5 "	6 43 "
March - -	o 47 "	5 55 "	o 22 "	7 8 "
April - -	o 39 "	6 32 "	1 0 "	7 11 "
May - -	o 47 "	6 40 "	1 0 "	7 12 "
June - -	o 46 "	6 38 "	o 57 "	7 7 "
July - -	1 1 "	6 43 "	o 52 "	7 11 "
August - -	o 42 "	6 17 "	o 42 "	7 8 "
September - -	o 45 "	6 29 "	o 51 "	7 10 "
October - -	o 39 "	6 17 "	o 36 "	6 59 "
November - -	o 47 "	6 24 "	o 34 "	6 57 "
December - -	o 40 "	5 55 "	o 22 "	7 7 "
Year - -	o 46 a.m.	6 20 a.m.	o 36 p.m.	7 4 p.m.

The times at which the pressure is at its mean daily value throughout the year vary as follows :—

h. m. h. m.
Between o 39 a.m. in { April and 1 1 a.m. in July - = 22 minutes range.
 { October }
Between 5 55 a.m. in { March and 6 43 a.m. in July - = 48 " "
 { December }
Between o 5 p.m. in { January and 1 0 p.m. in { April } = 55 " "
 { February } { May }
Between 6 43 p.m. in February and 7 12 p.m. in May - = 29 " "

As with the maxima and minima (see Table III.) the range in time is considerably greater in the day means than in those of the night.

The total time *below* the mean for six consecutive months is slightly longer from April to September than for the other six months of the year, but the excess only averages 5 minutes. The times for the various months are very similar, the greatest difference being 11 minutes.

The time *below* the mean is in defect of the time above the mean from January to March, it is an equal time above and below in November and December ; in all other months the time below the mean is in excess ; the greatest difference for any one month is 12 minutes.

For the whole year the time *below* the mean is 4 minutes in excess of the time above.

TABLE IV.—BAROMETER.

SQUARE 3.—SOUTHERN HALF.
Lat. 0° to 5° N. Long. 20° to 30° W.

TIMES at which the ATMOSPHERIC PRESSURE is at its MEAN DAILY VALUE.

Month.	Pressure decreasing.	Pressure increasing.	Pressure decreasing.	Pressure increasing.
	h. m.	h. m.	h. m.	h. m.
January - -	o 54 a.m.	6 15 a.m.	o 15 p.m.	6 51 p.m.
February - -	o 43 "	6 3 "	o 20 "	6 57 "
March - -	o 47 "	6 20 "	o 38 "	7 6 "
April - -	o 40 "	6 21 "	o 46 "	7 6 "
May - -	o 54 "	6 32 "	o 50 "	7 13 "
June - -	o 51 "	6 48 "	1 7 "	7 11 "
July - -	o 57 "	6 18 "	o 56 "	7 33 "
August - -	o 55 "	6 10 "	o 44 "	7 25 "
September - -	o 50 "	6 14 "	o 38 "	7 12 "
October - -	o 45 "	6 18 "	o 30 "	6 55 "
November - -	o 58 "	6 24 "	o 33 "	7 6 "
December - -	o 57 "	6 17 "	o 22 "	7 0 "
Year - -	o 51 a.m.	6 20 a.m.	o 38 p.m.	7 8 p.m.

The times at which the pressure is at its mean daily value throughout the year vary as follows :—

h. m. h. m.
Between o 40 a.m. in April and o 58 a.m. in November - = 18 minutes range.
Between 6 3 a.m. in February and 6 48 a.m. in June - = 45 " "
Between o 15 p.m. in January and 1 7 p.m. in June - = 52 " "
Between 6 51 p.m. in January and 7 33 p.m. in July - = 42 " "

The range in time for the day means is considerably greater than for that shortly after midnight.

The total time *below* the mean for six consecutive months is slightly longer from February to July than in the other half of the year, but the excess only averages 2 minutes. The times for the various months are remarkably similar, the greatest difference being 5 minutes.

The time *below* the mean is in defect of the time above the mean throughout the year, except from March to June, when it is slightly in excess ; the greatest difference in any one month is 8 minutes.

For the whole year the time *below* the mean is 2 minutes in defect of the time above.

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TABLE V.—BAROMETER.

SQUARE 3.—NORTHERN HALF.
Lat. 5° to 10° N. Long. 20° to 30° W.

ABSOLUTE MAXIMA and MINIMA ATMOSPHERIC PRESSURES with EXTENT of RANGE, obtained from the Individual Observations collected for the several Four-Hourly Means used in the present Discussion.

Month.	Mean Monthly Values.	Hour.	Maximum.	Hour.	Minimum.	Range.
	ins.		ins.		ins.	in.
January	- - 29·944	Noon.	30·053	4 a.m.	29·794	·259
February	- - 29·948	8 a.m.	30·070	4 p.m.	29·814	·256
March	- - 29·957	8 a.m.	30·123	4 p.m.	29·837	·286
April	- - 29·947	Midt.	30·069	4 p.m.	29·840	·229
May	- - 29·967	Noon.	30·107	4 p.m.	29·810	·297
June	- - 29·994	8 a.m.	30·117	{ 4 a.m. 4 p.m. }	29·853	·264
July	- - 30·008	8 a.m.	30·122	4 a.m.	29·864	·258
August	- - 29·992	8 a.m.	30·119	Midt.	29·818	·301
September	- - 29·982	8 a.m.	30·093	4 p.m.	29·847	·246
October	- - 29·953	8 a.m.	30·064	4 p.m.	29·827	·237
November	- - 29·938	8 a.m.	30·088	4 p.m.	29·793	·295
December	- - 29·937	8 a.m.	30·082	4 a.m.	*29·754	·328
Year	- - 29·963	8 a.m.	30·123	4 a.m.	*29·754	·369

* The minimum readings for both halves of the square were

TABLE V.—BAROMETER.

SQUARE 3.—SOUTHERN HALF.
Lat. 0° to 5° N. Long. 20° to 30° W.

ABSOLUTE MAXIMA and MINIMA ATMOSPHERIC PRESSURES with EXTENT of RANGE, obtained from the Individual Observations collected for the several Four-Hourly Means used in the present Discussion.

Month.	Mean Monthly Values.	Hour.	Maximum.	Hour.	Minimum.	Range.
	ins.		ins.		ins.	in.
January	- - 29·927	8 a.m.	30·026	4 p.m.	29·790	·236
February	- - 29·938	8 a.m.	30·073	4 p.m.	29·797	·276
March	- - 29·916	8 a.m.	30·054	4 a.m.	29·813	·241
April	- - 29·932	8 a.m.	30·061	4 a.m.	29·794	·267
May	- - 29·938	8 a.m.	30·069	4 p.m.	29·801	·268
June	- - 29·990	Noon.	30·088	4 a.m.	29·884	·204
July	- - 30·041	8 a.m.	30·138	4 p.m.	29·882	·256
August	- - 30·014	{ 8 a.m. Midt. }	30·113	4 p.m.	29·887	·226
September	- - 30·006	8 a.m.	30·111	4 p.m.	29·895	·216
October	- - 29·960	8 a.m.	30·074	4 p.m.	29·801	·273
November	- - 29·937	8 a.m.	30·045	4 a.m.	29·800	·245
December	- - 29·921	8 a.m.	30·045	4 a.m.	*29·725	·320
Year	- - 29·960	8 a.m.	30·138	4 a.m.	*29·725	·413

observed early in the month of December 1869, but by different ships.

TABLE VI.—BAROMETER.

SQUARE 3.—NORTHERN HALF.
Lat. 5° to 10° N. Long. 20° to 30° W.

INTERVAL and AMPLITUDE between the MAXIMA and MINIMA ATMOSPHERIC PRESSURES
deduced from Table 3.

Month.	Decrease between				Increase between			
	Morning Maximum and Afternoon Minimum.		Afternoon Maximum and Morning Minimum.		Morning Minimum and Morning Maximum.		Afternoon Minimum and Afternoon Maximum.	
	Interval.	Range.	Interval.	Range.	Interval.	Range.	Interval.	Range.
	h. m.	in.	h. m.	in.	h. m.	in.	h. m.	in.
January	6 20	—·084	5 35	—·065	5 35	+·070	6 30	+·079
February	6 15	—·070	5 42	—·059	5 36	+·062	6 27	+·067
March	6 25	—·079	5 32	—·052	5 51	+·062	6 12	+·069
April	6 14	—·079	5 46	—·063	6 6	+·076	5 54	+·066
May	6 16	—·070	5 44	—·063	5 59	+·072	6 1	+·061
June	6 14	—·063	5 47	—·056	5 59	+·063	6 0	+·056
July	6 15	—·059	5 45	—·055	5 51	+·058	6 9	+·056
August	6 18	—·062	5 41	—·046	6 0	+·054	6 1	+·054
September	6 17	—·067	5 42	—·055	5 58	+·064	6 3	+·058
October	6 16	—·067	5 44	—·053	5 56	+·061	6 4	+·059
November	6 13	—·076	5 46	—·065	5 53	+·070	6 8	+·071
December	6 27	—·082	5 31	—·055	5 48	+·068	6 14	+·069
Year	6 18	—·071	5 41	—·057	5 52	+·065	6 9	+·063

The total time that the atmospheric pressure is decreasing throughout the year is very similar to the time that it is increasing, the greatest difference being in January, when the interval of decrease is 10 minutes in defect of the interval of increase. The time of decrease is only in excess of the time of increase in June and then the difference is only 2 minutes. For the whole year the interval of decrease is 2 minutes in defect of the interval of increase.

Below are given the six consecutive months which have the greatest range:
Morning maximum and afternoon minimum, November to April.
Afternoon maximum and morning minimum, November to April.
Morning minimum and morning maximum, December to May.
Afternoon minimum and afternoon maximum, November to April.

For the whole year the range for:
Morning maximum and afternoon minimum exceeds that of the afternoon maximum and morning minimum by ·014 in.
Morning minimum and morning maximum exceeds that of the afternoon minimum and afternoon maximum by ·002 in.

TABLE VI.—BAROMETER.

SQUARE 3.—SOUTHERN HALF.
Lat. 0° to 5° N. Long. 20° to 30° W.

INTERVAL and AMPLITUDE between the MAXIMA and MINIMA ATMOSPHERIC PRESSURES
deduced from Table 3.

Month.	Decrease between				Increase between			
	Morning Maximum and Afternoon Minimum.		Afternoon Maximum and Morning Minimum.		Morning Minimum and Morning Maximum.		Afternoon Minimum and Afternoon Maximum.	
	Interval.	Range.	Interval.	Range.	Interval.	Range.	Interval.	Range.
	h. m.	in.	h. m.	in.	h. m.	in.	h. m.	in.
January	6 15	—·076	5 43	—·065	5 40	+·066	6 22	+·075
February	6 20	—·078	5 38	—·057	5 48	+·065	6 14	+·070
March	6 18	—·077	5 41	—·051	5 53	+·070	6 8	+·068
April	6 15	—·081	5 43	—·061	6 3	+·072	5 59	+·070
May	6 13	—·075	5 44	—·060	5 59	+·068	6 4	+·067
June	6 13	—·062	5 53	—·054	6 6	+·060	5 54	+·056
July	6 7	—·069	5 34	—·043	6 4	+·055	6 0	+·057
August	6 22	—·075	5 35	—·045	6 1	+·057	6 2	+·063
September	6 22	—·074	5 38	—·052	5 56	+·061	6 6	+·065
October	6 20	—·068	5 46	—·054	5 55	+·059	6 6	+·063
November	6 13	—·076	5 41	—·062	5 46	+·067	6 15	+·071
December	6 18	—·076	5 42	—·061	5 42	+·064	6 18	+·073
Year	6 17	—·073	5 41	—·056	5 54	+·063	6 8	+·066

The total time that the atmospheric pressure is decreasing throughout the year is, as in the Nn. half of square, very similar to the time that it is increasing, the greatest difference being a defect in the time of decrease amounting to 8 minutes in July. The interval of decrease is never in excess of the interval of increase. For the whole year the interval of decrease is 4 minutes in defect of the interval of increase.

Below are given the six consecutive months which have the greatest range:
Morning maximum and afternoon minimum, November to April.
Afternoon maximum and morning minimum, November to April.
Morning minimum and morning maximum, December to May.
Afternoon minimum and afternoon maximum, November to April.

For the whole year the range for:
Morning maximum and afternoon minimum exceeds that of the afternoon maximum and morning minimum by ·017 in.
Morning minimum and morning maximum is in defect of the afternoon minimum and afternoon maximum by ·003 in.

TABLE I.—AIR TEMPERATURE.

SQUARE 3.—NORTHERN HALF.

Lat. 5° to 10° N. Long. 20° to 30° W.

VALUES of the CONSTANTS in the Periodical Expression for the Diurnal Variations of Air Temperature.

Month.	No. of Days.	A.	B ₁ .	C ₁ .	B ₂ .	C ₂ .	B ₃ .	C ₃ .
January -	46	78.34	1.08	230 33	0.36	103 38	0.03	90
February -	51	77.35	1.13	235 31	0.27	100 22	0.07	90
March -	45	77.95	1.47	241 2	0.45	93 18	0.13	90
April -	45	78.42	1.54	244 59	0.51	90 19	-0.03	90
May -	56	78.58	1.11	234 0	0.40	83 48	-0.02	90
June -	89	79.10	1.17	248 7	0.41	82 21	0.01	90
July -	60	78.47	1.16	242 39	0.22	65 12	0.04	90
August -	54	78.31	1.12	242 14	0.25	71 24	-0.01	90
September -	54	79.37	1.45	233 51	0.30	66 5	0.03	90
October -	114	80.07	1.46	242 57	0.29	86 37	-0.03	90
November -	83	79.80	1.50	239 14	0.38	82 8	0.01	90
December -	33	79.31	1.23	237 50	0.30	76 15	0.06	90
Year -	730	78.76	1.29	239 38	0.34	85 8	0.02	90

TABLE I.—AIR TEMPERATURE.

SQUARE 3.—SOUTHERN HALF.

Lat. 0° to 5° N. Long. 20° to 30° W.

VALUES of the CONSTANTS in the Periodical Expression for the Diurnal Variations of Air Temperature.

Month.	No. of Days.	A.	B ₁ .	C ₁ .	B ₂ .	C ₂ .	B ₃ .	C ₃ .
January -	97	78.51	0.98	238 21	0.37	82 53	-0.07	90
February -	94	79.50	1.24	245 5	0.29	90 35	-0.03	90
March -	91	80.40	1.20	234 35	0.28	82 25	-0.01	90
April -	99	80.21	1.35	241 46	0.35	72 31	0.01	90
May -	83	79.90	0.93	236 17	0.29	99 9	0.02	90
June -	48	78.68	1.03	243 4	0.20	107 50	0.03	90
July -	44	77.63	1.23	246 32	0.37	111 47	0.06	90
August -	65	77.05	1.49	246 24	0.49	96 24	-0.02	90
September -	52	77.75	1.29	234 32	0.38	85 41	-0.01	90
October -	74	78.93	1.57	243 17	0.36	87 16	0.01	90
November -	74	79.22	1.35	245 28	0.38	88 16	-0.08	90
December -	55	79.46	1.53	240 56	0.49	74 3	-0.03	90
Year -	876	78.94	1.26	241 44	0.35	88 34	-0.01	90

TABLE II.—AIR TEMPERATURE.

SQUARE 3.—NORTHERN HALF.
Lat. 5° to 10° N. Long. 20° to 30° W.

DIURNAL RANGE of AIR TEMPERATURE for every HOUR.

Hour.	Jan.	Feb.	March.	April.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.	Year.
	°	°	°	°	°	°	°	°	°	°	°	°	°
	78.3	77.3	77.9	78.4	78.6	79.1	78.5	78.3	79.4	80.1	79.8	79.3	78.8
1 a.m.	-0.7	-0.9	-1.0	-1.1	-0.7	-0.8	-0.9	-0.8	-1.0	-1.2	-1.1	-0.8	-0.9
2 "	-1.0	-1.2	-1.3	-1.3	-0.9	-0.9	-1.0	-0.9	-1.2	-1.3	-1.3	-1.0	-1.1
3 "	-1.2	-1.3	-1.5	-1.4	-1.0	-1.0	-1.0	-1.0	-1.3	-1.3	-1.4	-1.2	-1.2
4 "	-1.3	-1.4	-1.6	-1.5	-1.2	-1.1	-1.0	-1.0	-1.4	-1.3	-1.5	-1.2	-1.3
5 "	-1.2	-1.3	-1.5	-1.4	-1.2	-1.0	-0.9	-0.9	-1.3	-1.2	-1.4	-1.2	-1.2
6 "	-1.0	-1.0	-1.2	-1.2	-1.1	-0.8	-0.7	-0.8	-1.1	-1.0	-1.1	-0.9	-1.0
7 "	-0.7	-0.6	-0.6	-0.7	-0.8	-0.5	-0.4	-0.5	-0.8	-0.6	-0.8	-0.6	-0.6
8 "	-0.2	-0.1	0.0	-0.1	-0.4	-0.1	-0.1	-0.2	-0.4	-0.1	-0.2	-0.2	-0.2
9 "	+0.2	+0.3	+0.5	+0.5	+0.1	+0.4	+0.3	+0.2	+0.1	+0.4	+0.3	+0.2	+0.3
10 "	+0.6	+0.7	+1.0	+1.1	+0.6	+0.9	+0.6	+0.6	+0.6	+0.9	+0.9	+0.7	+0.8
11 "	+0.9	+1.0	+1.4	+1.6	+1.0	+1.3	+1.0	+1.0	+1.1	+1.4	+1.3	+1.0	+1.2
Noon	+1.2	+1.2	+1.6	+1.9	+1.3	+1.5	+1.2	+1.2	+1.4	+1.6	+1.7	+1.3	+1.4
1 p.m.	+1.2	+1.3	+1.7	+2.0	+1.4	+1.5	+1.3	+1.3	+1.6	+1.7	+1.8	+1.4	+1.5
2 "	+1.2	+1.3	+1.7	+1.8	+1.3	+1.4	+1.3	+1.3	+1.7	+1.6	+1.7	+1.4	+1.5
3 "	+1.0	+1.2	+1.5	+1.4	+1.1	+1.1	+1.2	+1.1	+1.6	+1.4	+1.5	+1.3	+1.3
4 "	+0.8	+1.0	+1.1	+1.0	+0.8	+0.8	+1.0	+0.9	+1.3	+1.1	+1.2	+1.1	+1.0
5 "	+0.6	+0.8	+0.7	+0.5	+0.5	+0.4	+0.7	+0.6	+1.0	+0.7	+0.8	+0.7	+0.7
6 "	+0.3	+0.4	+0.3	+0.1	+0.3	0.0	+0.3	+0.3	+0.6	+0.4	+0.4	+0.4	+0.3
7 "	+0.2	+0.2	-0.1	-0.2	0.0	-0.2	0.0	0.0	+0.2	+0.1	+0.1	0.0	0.0
8 "	+0.1	-0.1	-0.4	-0.4	-0.1	-0.4	-0.3	-0.2	-0.1	-0.2	-0.2	-0.2	-0.2
9 "	0.0	-0.2	-0.5	-0.5	-0.2	-0.5	-0.5	-0.4	-0.4	-0.4	-0.4	-0.4	-0.4
10 "	-0.1	-0.4	-0.5	-0.6	-0.3	-0.6	-0.6	-0.5	-0.6	-0.7	-0.6	-0.5	-0.5
11 "	-0.3	-0.5	-0.6	-0.8	-0.4	-0.6	-0.7	-0.7	-0.7	-0.9	-0.7	-0.6	-0.6
Midnight	-0.5	-0.7	-0.7	-0.9	-0.5	-0.7	-0.8	-0.8	-0.9	-1.0	-0.9	-0.7	-0.8

The figures at the head of each column are the Mean Monthly Values. By combining these with the values in this Table are the same as those

TABLE II.—AIR TEMPERATURE.

SQUARE 3.—SOUTHERN HALF.
Lat. 0° to 5° N. Long. 20° to 30° W.

DIURNAL RANGE of AIR TEMPERATURE for every HOUR.

Hour.	Jan.	Feb.	March.	April.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.	Year.
	°	°	°	°	°	°	°	°	°	°	°	°	°
	78.5	79.5	80.4	80.2	79.9	78.7	77.6	77.1	77.7	78.9	79.2	79.5	78.9
1 a.m.	-0.6	-1.0	-0.9	-1.0	-0.6	-0.9	-0.9	-1.1	-0.9	-1.2	-1.1	-1.0	-0.9
2 "	-0.8	-1.1	-1.0	-1.1	-0.8	-1.0	-1.2	-1.3	-1.1	-1.4	-1.1	-1.2	-1.1
3 "	-0.9	-1.2	-1.1	-1.2	-1.0	-1.1	-1.3	-1.4	-1.2	-1.5	-1.2	-1.3	-1.2
4 "	-0.9	-1.1	-1.2	-1.2	-1.0	-1.0	-1.3	-1.5	-1.3	-1.5	-1.2	-1.4	-1.2
5 "	-1.0	-1.0	-1.1	-1.2	-1.0	-0.9	-1.2	-1.4	-1.3	-1.4	-1.1	-1.4	-1.2
6 "	-0.9	-0.8	-1.0	-1.0	-0.8	-0.7	-0.8	-1.1	-1.1	-1.1	-0.9	-1.2	-0.9
7 "	-0.7	-0.5	-0.7	-0.6	-0.5	-0.3	-0.4	-0.6	-0.8	-0.6	-0.6	-0.9	-0.6
8 "	-0.3	-0.1	-0.3	-0.2	-0.1	0.0	+0.1	-0.1	-0.4	-0.1	-0.1	-0.4	-0.2
9 "	+0.1	+0.4	+0.2	+0.3	+0.2	+0.4	+0.6	+0.6	+0.2	+0.5	+0.4	+0.3	+0.3
10 "	+0.6	+0.9	+0.6	+0.8	+0.6	+0.7	+1.0	+1.2	+0.7	+1.0	+1.0	+0.9	+0.8
11 "	+1.0	+1.2	+1.0	+1.2	+0.9	+0.9	+1.3	+1.6	+1.1	+1.5	+1.4	+1.5	+1.2
Noon	+1.3	+1.4	+1.3	+1.5	+1.0	+1.1	+1.4	+1.9	+1.4	+1.8	+1.7	+1.8	+1.5
1 p.m.	+1.3	+1.5	+1.4	+1.7	+1.1	+1.1	+1.4	+1.9	+1.6	+1.8	+1.7	+2.0	+1.5
2 "	+1.2	+1.4	+1.4	+1.6	+1.0	+1.1	+1.3	+1.7	+1.5	+1.8	+1.5	+1.9	+1.4
3 "	+0.9	+1.2	+1.2	+1.4	+0.9	+0.9	+1.0	+1.3	+1.3	+1.5	+1.2	+1.6	+1.2
4 "	+0.6	+0.8	+1.0	+1.1	+0.7	+0.7	+0.8	+0.9	+1.0	+1.2	+0.8	+1.2	+0.9
5 "	+0.4	+0.5	+0.7	+0.7	+0.4	+0.5	+0.4	+0.5	+0.7	+0.7	+0.5	+0.7	+0.6
6 "	+0.1	+0.2	+0.4	+0.3	+0.2	+0.3	+0.1	+0.1	+0.4	+0.3	+0.2	+0.3	+0.2
7 "	0.0	0.0	+0.2	0.0	+0.1	+0.1	-0.1	-0.2	+0.1	0.0	-0.1	-0.1	0.0
8 "	-0.1	-0.2	0.0	-0.3	-0.1	-0.1	-0.2	-0.3	-0.1	-0.3	-0.2	-0.4	-0.2
9 "	-0.2	-0.4	-0.2	-0.5	-0.1	-0.3	-0.4	-0.5	-0.2	-0.5	-0.4	-0.5	-0.4
10 "	-0.3	-0.6	-0.4	-0.6	-0.2	-0.4	-0.4	-0.6	-0.4	-0.7	-0.6	-0.7	-0.5
11 "	-0.4	-0.7	-0.5	-0.7	-0.3	-0.6	-0.6	-0.7	-0.5	-0.9	-0.8	-0.8	-0.6
Midnight	-0.5	-0.9	-0.7	-0.9	-0.5	-0.7	-0.7	-0.9	-0.7	-1.0	-0.9	-0.9	-0.8

amount of range at any hour, the temperature of the air for that hour can be obtained. shown by the air temperature curves on Diagrams 2 and 3.

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TABLE III.—AIR TEMPERATURE.

SQUARE 3.—NORTHERN HALF.
Lat. 5° to 10° N. Long. 20° to 30° W.

TIMES of the MAXIMA and MINIMA AIR TEMPERATURES and their corresponding Differences from the Daily Mean.

Month.	Minimum.		Maximum.		Range.
	Time.	Difference.	Time.	Difference.	
	h. m.	°	h. m.	°	
January	4 14 a.m.	-1.3	1 2 p.m.	+1.2	2.5
February	3 48 "	-1.4	1 32 "	+1.4	2.8
March	4 0 "	-1.6	1 14 "	+1.7	3.3
April	4 0 "	-1.5	0 40 "	+2.0	3.5
May	4 38 "	-1.2	1 3 "	+1.4	2.6
June	4 6 "	-1.1	0 47 "	+1.5	2.6
July	3 27 "	-1.0	1 36 "	+1.3	2.3
August	3 37 "	-1.0	1 13 "	+1.3	2.3
September	4 1 "	-1.4	1 50 "	+1.7	3.1
October	3 14 "	-1.4	0 48 "	+1.7	3.1
November	3 56 "	-1.5	1 11 "	+1.8	3.3
December	4 1 "	-1.2	1 37 "	+1.5	2.7
Year	3 58 a.m.	-1.3	1 10 p.m.	+1.5	2.8

The times of the maxima and minima throughout the year vary as follows:—

Minimum between 3 14 a.m. in October and 4 38 a.m. in May = 1 hour 24 minutes range.
Maximum between 0 40 p.m. in April and 1 50 p.m. in September = 1 hour 10 minutes range.

It is thus shown that the range in time is less with the maximum than with the minimum temperature.

The interval during which temperature is increasing is considerably less throughout the year than the interval it is decreasing. The six consecutive months showing the shortest time that the temperature is increasing are from January to June, the interval averaging 8 hours 55 minutes, the other six months average 9 hours 40 minutes. For the whole year the temperature is increasing *9 hours 12 minutes.

The diurnal range for six consecutive months is largest from November to April.

The greatest range in any one month is 3.5 in April.

The least " " 2.3 in { July
August.

The amount of the maximum temperature above the daily mean is in excess of the amount of the minimum temperature below the daily mean throughout the year, except in January and February, January being slightly in defect and February equal. For the whole year the amount of the maximum temperature above the daily mean exceeds that of the minimum below it by 0.2.

* The statements for the year are obtained from the results by formula,

TABLE III.—AIR TEMPERATURE.

SQUARE 3.—SOUTHERN HALF.
Lat. 0° to 5° N. Long. 20° to 30° W.

TIMES of the MAXIMA and MINIMA AIR TEMPERATURES and their corresponding Differences from the Daily Mean.

Month.	Minimum.		Maximum.		Range.
	Time.	Difference.	Time.	Difference.	
	h. m.	°	h. m.	°	
January	4 48 a.m.	-1.0	0 47 p.m.	+1.3	2.3
February	3 19 "	-1.2	0 48 "	+1.5	2.7
March	4 3 "	-1.2	1 18 "	+1.4	2.6
April	3 54 "	-1.2	1 16 "	+1.7	2.9
May	4 5 "	-1.0	0 55 "	+1.1	2.1
June	3 18 "	-1.1	0 56 "	+1.1	2.2
July	3 36 "	-1.4	0 25 "	+1.4	2.8
August	3 40 "	-1.5	0 32 "	+1.9	3.4
September	4 19 "	-1.3	1 8 "	+1.6	2.9
October	3 35 "	-1.5	1 1 "	+1.8	3.3
November	3 33 "	-1.2	0 39 "	+1.7	2.9
December	4 23 "	-1.4	1 2 "	+2.0	3.4
Year	3 52 a.m.	-1.2	0 54 p.m.	+1.5	2.7

The times of the maxima and minima throughout the year vary as follows:—

Minimum between 3 18 a.m. in June and 4 48 a.m. in January = 1 hour 30 minutes range.

Maximum between 0 25 p.m. in July and 1 18 p.m. in March = 53 minutes range.

As in the Northern half it is shown that the range in time is less in the case of the maximum than in that of the minimum temperature.

The interval during which temperature is increasing is also considerably less throughout the year than the interval it is decreasing. The six consecutive months showing the shortest time that the temperature is increasing are from August to January, averaging 8 hours 49 minutes, the other half of year averages 9 hours 14 minutes, this result is almost the reverse of that shown in the Northern half. For the whole year the temperature is increasing 9 hours 2 minutes.

The diurnal range for six consecutive months is largest from July to December.

The greatest range in any one month is 3.4 in { August.
December.

The least " " 2.1 in May.

The amount of the maximum temperature above the daily mean is in excess of the amount of the minimum temperature below the daily mean throughout the year, except in June and July, when the amounts of maxima and minima are exactly similar. For the whole year the amount of the maximum above the daily mean exceeds that of the minimum below it by 0.3.

and differ slightly from the arithmetical mean of the 12 months.

TABLE IV.—AIR TEMPERATURE.

SQUARE 3.—NORTHERN HALF.

Lat. 5° to 10° N. Long. 20° to 30° W.

TIMES at which the AIR TEMPERATURE is at its MEAN DAILY VALUE.

Month.	Temperature increasing.	Temperature decreasing.
	h. m.	h. m.
January - -	8 33 a.m.	8 33 p.m.
February - -	8 16 „	7 44 „
March - - -	8 4 „	6 42 „
April - - -	8 14 „	6 29 „
May - - - -	8 46 „	7 17 „
June - - - -	8 9 „	6 6 „
July - - - -	8 14 „	7 0 „
August - - -	8 24 „	7 3 „
September -	8 45 „	7 39 „
October - - -	8 13 „	7 13 „
November - -	8 26 „	7 13 „
December - -	8 27 „	7 7 „
Year - - - -	8 22 a.m.	7 3 p.m.

The times at which the air temperature is at its mean daily value throughout the year vary as follows:—

h. m. h. m.
Between 8 4 a.m. in March and 8 46 a.m. in May = 42 minutes range.
Between 6 6 p.m. in June and 8 33 p.m. in January = 2 hours 27 minutes range.

The time *above* the mean for six consecutive months is longest from September to February, when it averages 11 hours 8 minutes; the other six months only average 10 hours 28 minutes. It is in defect of the time below the mean in every month except January, when the times above and below are each 12 hours. The results for the latter part of the day in January, however, are not very satisfactory. For the whole year the time *above* the mean is *10 hours 41 minutes.

* The statements for the year are obtained from the results by formula,

TABLE IV.—AIR TEMPERATURE.

SQUARE 3.—SOUTHERN HALF.

Lat. 0° to 5° N. Long. 20° to 30° W.

TIMES at which the AIR TEMPERATURE is at its MEAN DAILY VALUE.

Month.	Temperature increasing.	Temperature decreasing.
	h. m.	h. m.
January - -	8 43 a.m.	6 56 p.m.
February - -	8 8 „	6 55 „
March - - -	8 40 „	7 46 „
April - - -	8 25 „	6 53 „
May - - - -	8 22 „	7 30 „
June - - - -	7 53 „	7 20 „
July - - - -	7 43 „	6 37 „
August - - -	8 5 „	6 24 „
September -	8 40 „	7 33 „
October - - -	8 10 „	6 58 „
November - -	8 16 „	6 45 „
December - -	8 35 „	6 45 „
Year - - - -	8 18 a.m.	6 58 p.m.

The times at which the air temperature is at its mean daily value throughout the year vary as follows:—

h. m. h. m.
Between 7 43 a.m. in July and 8 43 a.m. in January = 1 hour range.
Between 6 24 p.m. in August and 7 46 p.m. in March = 1 hour 22 minutes range.

The time *above* the mean for six consecutive months is longest from February to July, averaging 10 hours 58 minutes; the other six months average 10 hours 29 minutes. It is in defect of the time below the mean throughout the year. For the whole year the time *above* the mean is *10 hours 40 minutes, and differ slightly from the arithmetical mean of the 12 months.

TABLE V.—AIR TEMPERATURE.

SQUARE 3.—NORTHERN HALF.
Lat. 5° to 10° N. Long. 20° to 30° W.

ABSOLUTE MAXIMA and MINIMA AIR TEMPERATURES with EXTENT of RANGE, obtained from the Individual Observations collected for the several Four-Hourly Means used in the present Discussion.

Month.	Mean Monthly Values.	Hour.	Maximum.	Hour.	Minimum.	Range.
January - -	78°·3	Noon.	84°·0	4 a.m.	72°·5	11°·5
February - -	77°·3	4 p.m.	86°·0	4 a.m.	72°·0	14°·0
March - - -	77°·9	Noon.	84°·5	4 a.m.	71°·9	12°·6
April - - -	78°·4	Noon.	86°·5	4 a.m.	71°·0	15°·5
May - - -	78°·6	Noon.	84°·4	4 a.m.	73°·0	11°·4
June - - -	79°·1	{ Noon. 4 p.m. }	85°·2	4 a.m.	73°·0 r	12°·2
July - - -	78°·5	4 p.m.	84°·5	{ 4 p.m. 8 p.m. Midt. }	74°·0 r	10°·5
August - - -	78°·3	Noon.	84°·4	4 a.m.	70°·9 r	13°·5
September - -	79°·4	4 p.m.	85°·1	8 a.m.	74°·0 r	11°·1
October - - -	80°·1	4 p.m.	86°·8	{ 4 a.m. Midt. }	75°·0 r	11°·8
November - -	79°·8	4 p.m.	85°·6	4 p.m.	74°·0 r	11°·6
December - -	79°·3	Noon.	85°·3	8 a.m.	74°·5 r	10°·8
Year - - -	78°·8	4 p.m.	86°·8	4 a.m.	70°·9 r	15°·9

The letter r given with the Minimum

TABLE V.—AIR TEMPERATURE.

SQUARE 3.—SOUTHERN HALF.
Lat. 0° to 5° N. Long. 20° to 30° W.

ABSOLUTE MAXIMA and MINIMA AIR TEMPERATURES with EXTENT of RANGE, obtained from the Individual Observations collected for the several Four-Hourly Means used in the present Discussion.

Month.	Mean Monthly Values.	Hour.	Maximum.	Hour.	Minimum.	Range.
January - -	78°·5	Noon.	85°·3	4 p.m.	73°·8 r	11°·5
February - -	79°·5	Noon.	86°·8	{ 4 a.m. Midt. }	73°·2 r	13°·6
March - - -	80°·4	Noon.	86°·2	4 a.m.	75°·4 r	10°·8
April - - -	80°·2	Noon.	87°·5	4 a.m.	73°·9 r	13°·6
May - - -	79°·9	{ Noon. 4 p.m. }	86°·0	4 p.m.	74°·1 r	11°·9
June - - -	78°·7	Noon.	84°·0	Midt.	75°·5	8°·5
July - - -	77°·6	Noon.	82°·4	4 a.m.	70°·8	11°·6
August - - -	77°·1	Noon.	83°·8	4 a.m.	72°·5	11°·3
September - -	77°·7	Noon.	83°·0	4 a.m.	72°·9	10°·1
October - - -	78°·9	4 p.m.	85°·5	4 a.m.	74°·5 r	11°·0
November - -	79°·2	Noon.	84°·7	{ 8 p.m. Midt. }	75°·0 r	9°·7
December - -	79°·5	Noon.	85°·0	Midt.	73°·3 r	11°·7
Year - - -	78°·9	Noon.	87°·5	4 a.m.	70°·8	16°·7

Temperature shows that rain was falling at time of observation.

TABLE I.—SEA TEMPERATURE.

SQUARE 3.—NORTHERN HALF.
Lat. 5° to 10° N. Long. 20° to 30° W.

VALUES of the CONSTANTS in the Periodical Expression for the Diurnal Variations of Sea Temperature.

Month.	No. of Days.	A.	B ₁ .	C ₁ .	B ₂ .	C ₂ .	B ₃ .	C ₃ .
January -	30	78.93	0.46	236 28	0.11	112 0	0.05	90
February -	32	78.45	0.54	241 46	0.08	70 53	-0.02	90
March -	31	79.11	0.55	223 39	0.20	78 12	-0.03	90
April -	27	78.96	0.73	230 43	0.20	84 5	0.03	90
May -	46	79.99	0.55	224 24	0.07	83 5	0.00	90
June -	78	80.29	0.48	244 12	0.08	90 0	-0.01	90
July -	51	79.81	0.60	238 24	0.12	77 56	0.00	90
August -	29	79.27	0.61	241 52	0.13	95 11	-0.04	90
September -	36	80.50	0.72	229 12	0.10	74 10	0.03	90
October -	65	81.23	0.79	233 42	0.23	75 43	0.00	90
November -	45	81.30	0.50	226 38	0.12	50 9	-0.02	90
December -	31	80.33	0.49	228 44	0.13	86 13	-0.01	90
Year -	501	79.85	0.58	233 5	0.13	80 49	0.00	90

TABLE I.—SEA TEMPERATURE.

SQUARE 3.—SOUTHERN HALF.
Lat. 0° to 5° N. Long. 20° to 30° W.

VALUES of the CONSTANTS in the Periodical Expression for the Diurnal Variations of Sea Temperature.

Month.	No. of Days.	A.	B ₁ .	C ₁ .	B ₂ .	C ₂ .	B ₃ .	C ₃ .
January -	66	79.74	0.34	236 20	0.06	81 1	0.00	90
February -	90	80.81	0.51	229 36	0.15	64 32	-0.01	90
March -	64	81.23	0.63	229 30	0.13	71 24	0.00	90
April -	56	81.42	0.62	229 37	0.21	92 26	0.02	90
May -	57	81.53	0.71	235 8	0.10	114 10	0.04	90
June -	46	80.28	0.50	235 24	0.07	90 0	0.02	90
July -	40	78.78	0.55	231 16	0.09	73 36	0.02	90
August -	46	77.25	0.58	236 42	0.09	68 15	-0.01	90
September -	28	78.73	0.48	227 2	0.11	99 13	0.05	90
October -	40	79.98	0.63	240 45	0.15	82 15	0.01	90
November -	40	79.94	0.71	231 55	0.11	49 6	-0.05	90
December -	32	79.80	0.63	240 55	0.08	86 1	0.01	90
Year -	605	79.96	0.57	233 49	0.11	79 7	0.01	90

TABLE II.—SEA TEMPERATURE.

SQUARE 3.—NORTHERN HALF.
Lat. 5° to 10° N. Long. 20° to 30° W.

DIURNAL RANGE of SEA TEMPERATURE for EVERY HOUR.

Hour.	Jan.	Feb.	March.	April.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.	Year.
	78.9	78.5	79.1	79.0	80.0	80.3	79.8	79.3	80.5	81.2	81.3	80.3	79.8
1 a.m. -	-0.3	-0.5	-0.3	-0.5	-0.4	-0.4	-0.5	-0.5	-0.5	-0.5	-0.3	-0.3	-0.4
2 " -	-0.4	-0.5	-0.4	-0.6	-0.5	-0.4	-0.5	-0.6	-0.6	-0.6	-0.4	-0.4	-0.5
3 " -	-0.5	-0.5	-0.5	-0.7	-0.5	-0.5	-0.6	-0.6	-0.7	-0.7	-0.4	-0.5	-0.6
4 " -	-0.5	-0.5	-0.6	-0.8	-0.6	-0.4	-0.6	-0.6	-0.7	-0.8	-0.4	-0.5	-0.6
5 " -	-0.5	-0.4	-0.6	-0.8	-0.5	-0.4	-0.5	-0.5	-0.7	-0.8	-0.5	-0.5	-0.6
6 " -	-0.4	-0.3	-0.6	-0.7	-0.5	-0.3	-0.4	-0.4	-0.6	-0.7	-0.4	-0.5	-0.5
7 " -	-0.2	-0.2	-0.5	-0.5	-0.3	-0.2	-0.3	-0.3	-0.4	-0.5	-0.4	-0.3	-0.3
8 " -	0.0	-0.1	-0.3	-0.2	-0.2	0.0	-0.1	-0.1	-0.2	-0.3	-0.2	-0.2	-0.1
9 " -	+0.2	+0.1	-0.1	+0.1	0.0	+0.2	+0.1	+0.2	0.0	+0.1	-0.1	0.0	+0.1
10 " -	+0.3	+0.3	+0.2	+0.3	+0.2	+0.3	+0.3	+0.4	+0.3	+0.4	+0.1	+0.2	+0.3
11 " -	+0.4	+0.5	+0.4	+0.6	+0.3	+0.4	+0.5	+0.6	+0.5	+0.7	+0.3	+0.4	+0.5
Noon -	+0.4	+0.6	+0.6	+0.7	+0.5	+0.5	+0.6	+0.7	+0.6	+0.9	+0.5	+0.5	+0.6
1 p.m. -	+0.5	+0.6	+0.7	+0.8	+0.5	+0.5	+0.7	+0.7	+0.7	+1.0	+0.6	+0.6	+0.7
2 " -	+0.5	+0.6	+0.7	+0.8	+0.6	+0.5	+0.7	+0.7	+0.8	+0.9	+0.6	+0.6	+0.7
3 " -	+0.4	+0.5	+0.6	+0.8	+0.6	+0.5	+0.6	+0.5	+0.8	+0.8	+0.6	+0.5	+0.6
4 " -	+0.4	+0.4	+0.4	+0.6	+0.5	+0.3	+0.5	+0.4	+0.7	+0.7	+0.5	+0.4	+0.5
5 " -	+0.3	+0.3	+0.3	+0.5	+0.4	+0.2	+0.3	+0.3	+0.6	+0.4	+0.4	+0.3	+0.4
6 " -	+0.2	+0.2	+0.2	+0.3	+0.3	+0.1	+0.2	+0.2	+0.4	+0.2	+0.3	+0.2	+0.2
7 " -	0.0	+0.1	+0.1	+0.1	+0.2	0.0	+0.1	+0.1	+0.2	+0.1	+0.1	+0.1	+0.1
8 " -	0.0	-0.1	0.0	0.0	+0.1	-0.1	-0.1	0.0	0.0	-0.1	0.0	0.0	0.0
9 " -	-0.1	-0.2	0.0	-0.1	0.0	-0.2	-0.2	-0.1	-0.1	-0.2	-0.1	0.0	-0.1
10 " -	-0.1	-0.3	-0.1	-0.2	-0.1	-0.2	-0.2	-0.3	-0.2	-0.3	-0.2	-0.1	-0.2
11 " -	-0.2	-0.4	-0.1	-0.2	-0.2	-0.3	-0.3	-0.4	-0.3	-0.3	-0.2	-0.2	-0.3
Midnight -	-0.2	-0.4	-0.2	-0.3	-0.3	-0.4	-0.4	-0.5	-0.4	-0.4	-0.3	-0.3	-0.3

The figures at the head of each column are the Mean Monthly Values. By combining these with the values in this Table are the same as those shown

TABLE II.—SEA TEMPERATURE.

SQUARE 3.—SOUTHERN HALF.
Lat. 0° to 5° N. Long. 20° to 30° W.

DIURNAL RANGE of SEA TEMPERATURE for EVERY HOUR.

Hour.	Jan.	Feb.	March.	April.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.	Year.
	79.7	80.8	81.2	81.4	81.5	80.3	78.8	77.3	78.7	80.0	79.9	79.8	80.0
1 a.m. -	-0.3	-0.3	-0.4	-0.4	-0.6	-0.4	-0.4	-0.5	-0.3	-0.5	-0.6	-0.5	-0.4
2 " -	-0.3	-0.4	-0.5	-0.5	-0.7	-0.5	-0.5	-0.5	-0.4	-0.5	-0.6	-0.6	-0.5
3 " -	-0.3	-0.4	-0.6	-0.6	-0.8	-0.5	-0.5	-0.5	-0.5	-0.6	-0.6	-0.6	-0.5
4 " -	-0.3	-0.5	-0.6	-0.7	-0.8	-0.5	-0.6	-0.5	-0.6	-0.6	-0.6	-0.6	-0.6
5 " -	-0.3	-0.5	-0.6	-0.7	-0.7	-0.5	-0.5	-0.5	-0.5	-0.6	-0.6	-0.5	-0.5
6 " -	-0.2	-0.5	-0.5	-0.6	-0.5	-0.4	-0.4	-0.4	-0.4	-0.5	-0.5	-0.4	-0.4
7 " -	-0.2	-0.4	-0.4	-0.4	-0.3	-0.2	-0.3	-0.3	-0.3	-0.3	-0.4	-0.2	-0.3
8 " -	-0.1	-0.2	-0.2	-0.2	0.0	-0.1	-0.1	-0.1	-0.1	-0.1	-0.2	0.0	-0.1
9 " -	+0.1	0.0	0.0	+0.1	+0.2	+0.1	0.0	+0.1	+0.1	+0.2	0.0	+0.2	+0.1
10 " -	+0.2	+0.2	+0.2	+0.3	+0.4	+0.2	+0.2	+0.3	+0.2	+0.4	+0.2	+0.4	+0.3
11 " -	+0.3	+0.4	+0.4	+0.5	+0.5	+0.4	+0.4	+0.4	+0.3	+0.6	+0.5	+0.5	+0.4
Noon -	+0.3	+0.5	+0.6	+0.7	+0.6	+0.5	+0.5	+0.6	+0.5	+0.7	+0.8	+0.7	+0.6
1 p.m. -	+0.4	+0.6	+0.7	+0.7	+0.7	+0.5	+0.6	+0.6	+0.5	+0.7	+0.8	+0.7	+0.6
2 " -	+0.4	+0.6	+0.7	+0.7	+0.7	+0.5	+0.6	+0.6	+0.5	+0.6	+0.7	+0.6	+0.6
3 " -	+0.3	+0.6	+0.7	+0.6	+0.7	+0.5	+0.5	+0.5	+0.4	+0.5	+0.6	+0.5	+0.5
4 " -	+0.3	+0.5	+0.6	+0.5	+0.6	+0.4	+0.5	+0.4	+0.4	+0.3	+0.5	+0.4	+0.4
5 " -	+0.2	+0.3	+0.4	+0.3	+0.5	+0.3	+0.4	+0.4	+0.3	+0.2	+0.4	+0.2	+0.2
6 " -	+0.1	+0.2	+0.3	+0.2	+0.3	+0.2	+0.3	+0.2	+0.2	+0.2	+0.4	+0.2	+0.1
7 " -	+0.1	+0.1	+0.1	+0.1	+0.2	+0.1	+0.1	+0.1	+0.1	0.0	+0.2	+0.1	+0.1
8 " -	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	-0.1	0.0	-0.1	0.0
9 " -	-0.1	-0.1	-0.1	-0.1	-0.1	-0.1	-0.1	-0.2	-0.1	-0.3	-0.3	-0.3	-0.2
10 " -	-0.1	-0.2	-0.2	-0.2	-0.3	-0.2	-0.3	-0.3	-0.1	-0.3	-0.4	-0.4	-0.3
11 " -	-0.2	-0.2	-0.3	-0.2	-0.4	-0.3	-0.3	-0.4	-0.2	-0.4	-0.5	-0.5	-0.3
Midnight -	-0.2	-0.3	-0.4	-0.2	-0.4	-0.3	-0.4	-0.4	-0.2	-0.4	-0.5	-0.5	-0.3

the amount of range at any hour, the temperature of the sea for that hour can be obtained by the sea temperature curves on Diagrams 2 and 3.

TABLE III.—SEA TEMPERATURE.

SQUARE 3.—NORTHERN HALF.
Lat. 5° to 10° N. Long. 20° to 30° W.

TIMES of the MAXIMA and MINIMA SEA TEMPERATURES and their corresponding Differences from the Daily Mean.

Month.	Minimum.		Maximum.		Range.
	Time.	Difference.	Time.	Difference.	
	h. m.	°	h. m.	°	°
January - -	3 46 a.m.	- 0·6	1 49 p.m.	+ 0·5	1·1
February - -	2 28 "	- 0·5	1 14 "	+ 0·6	1·1
March - -	5 13 "	- 0·6	1 19 "	+ 0·7	1·3
April - -	4 17 "	- 0·8	1 41 "	+ 0·8	1·6
May - -	3 59 "	- 0·6	2 14 "	+ 0·6	1·2
June - -	2 59 "	- 0·5	0 59 "	+ 0·5	1·0
July - -	3 43 "	- 0·6	1 22 "	+ 0·7	1·3
August - -	2 54 "	- 0·6	0 44 "	+ 0·7	1·3
September - -	3 48 "	- 0·7	2 21 "	+ 0·8	1·5
October - -	4 28 "	- 0·8	1 23 "	+ 1·0	1·8
November - -	5 2 "	- 0·5	1 52 "	+ 0·6	1·1
December - -	4 29 "	- 0·5	1 17 "	+ 0·6	1·1
Year - -	4 3 a.m.	- 0·6	1 29 p.m.	+ 0·7	1·3

The times of the maxima and minima throughout the year vary as follows :

Minimum between 2 28 a.m. in February and 5 13 a.m. in March = 2 hours 45 minutes range.
Maximum between 0 44 p.m. in August and 2 21 p.m. in September = 1 hour 37 minutes range.

As with the Air Temperature the range in time is considerably less with the maximum than with the minimum.

The time during which the Sea Temperature is increasing is considerably less than the time it is decreasing throughout the year. The six consecutive months showing the shortest time are from October to March, averaging 9 hours 15 minutes; the other six months average 9 hours 57 minutes. For the whole year the temperature is increasing *9 hours 26 minutes.

The diurnal range for six consecutive months is largest from July to December.

The greatest range in any one month is 1·8 in October.

The least " " 1·0 in June.

The amount of the maximum temperature above the daily mean is in excess of the amount of the minimum temperature below the daily mean in February and March, and from July to December; the amounts are equal from April to June, and in January the amount of the maximum is slightly in defect. For the whole year the amount of the maximum temperature above the daily mean exceeds that of the minimum below it by 0·1.

* The statements for the year are obtained from the results by formula,

TABLE III.—SEA TEMPERATURE.

SQUARE 3.—SOUTHERN HALF.
Lat. 0° to 5° N. Long. 20° to 30° W.

TIMES of the MAXIMA and MINIMA SEA TEMPERATURES and their corresponding Differences from the Daily Mean.

Month.	Minimum.		Maximum.		Range.
	Time.	Difference.	Time.	Difference.	
	h. m.	°	h. m.	°	°
January - -	3 28 a.m.	- 0·3	1 26 p.m.	+ 0·4	0·7
February - -	4 54 "	- 0·5	1 34 "	+ 0·6	1·1
March - -	4 13 "	- 0·6	1 45 "	+ 0·7	1·3
April - -	4 25 "	- 0·7	1 13 "	+ 0·7	1·4
May - -	3 27 "	- 0·8	1 55 "	+ 0·7	1·5
June - -	3 32 "	- 0·5	1 45 "	+ 0·5	1·0
July - -	3 54 "	- 0·6	2 3 "	+ 0·6	1·2
August - -	3 24 "	- 0·5	1 34 "	+ 0·7	1·2
September - -	4 5 "	- 0·6	2 23 "	+ 0·5	1·1
October - -	3 48 "	- 0·6	1 14 "	+ 0·7	1·3
November - -	2 16 "	- 0·6	1 37 "	+ 0·8	1·4
December - -	3 2 "	- 0·6	1 24 "	+ 0·7	1·3
Year - -	3 49 a.m.	- 0·6	1 39 p.m.	+ 0·6	1·2

The times of the maxima and minima throughout the year vary as follows :

Minimum between 2 16 a.m. in November and 4 54 a.m. in February = 2 hours 38 minutes range.
Maximum between 1 13 p.m. in April and 2 23 p.m. in September = 1 hour 10 minutes range.

The range in time of the maximum is again considerably less than that of the minimum.

Throughout the year the time during which sea temperature is increasing is considerably less than the time it is decreasing. The six consecutive months showing the shortest time are from January to June averaging 9 hours 37 minutes; for the other half of year the average time is 10 hours 18 minutes. For the whole year the time of increase is *9 hours 50 minutes.

The diurnal range for six consecutive months is largest from March to August.

The greatest range in any one month is 1·5 in May.

The least " " 0·7 in January.

The amount of the maximum temperature above the daily mean is in excess of the amount of the minimum below the daily mean from October to March, and in August; the amounts are equal in April, June, and July, and in May and September the amount of the maximum is slightly in defect. For the whole year the amounts of maximum and minimum are the same.

and differ slightly from the arithmetical mean of the 12 months.

TABLE IV.—SEA TEMPERATURE.

SQUARE 3.—NORTHERN HALF.
Lat. 5° to 10° N. Long. 20° to 30° W.

TIMES at which the SEA TEMPERATURE is at its MEAN DAILY VALUE.

Month.	Temperature increasing.	Temperature decreasing.
	h. m.	h. m.
January - -	8 0 a.m.	7 30 p.m.
February - -	8 20 „	7 27 „
March - -	9 16 „	8 50 „
April - -	8 44 „	7 50 „
May - -	9 6 „	9 0 „
June - -	8 4 „	7 13 „
July - -	8 29 „	7 27 „
August - -	8 18 „	7 42 „
September -	8 49 „	8 14 „
October - -	8 48 „	7 30 „
November -	9 24 „	8 20 „
December -	8 57 „	8 34 „
Year - -	8 43 a.m.	7 55 p.m.

The times at which the sea temperature is at its mean daily value, throughout the year, vary as follows :—

Between 8 0 a.m. in January and 9 24 a.m. in November = 1 hour 24 minutes range.
Between 7 13 p.m. in June and 9 0 p.m. in May = 1 hour 47 minutes range.

The time *above* the mean for six consecutive months is longest from December to May, averaging 11 hours 28 minutes; the average for the other six months is 11 hours 6 minutes. It is in defect of the time below the mean throughout the year. For the whole year the time *above* the mean is *11 hours 12 minutes.

* The statements for the year are obtained from the results by formula,

TABLE IV.—SEA TEMPERATURE.

SQUARE 3.—SOUTHERN HALF.
Lat. 0° to 5° N. Long. 20° to 30° W.

TIMES at which the SEA TEMPERATURE is at its MEAN DAILY VALUE.

Month.	Temperature increasing.	Temperature decreasing.
	h. m.	h. m.
January - -	8 30 a.m.	7 45 p.m.
February - -	9 9 „	7 48 „
March - -	8 57 „	8 15 „
April - -	8 42 „	8 0 „
May - -	8 8 „	8 5 „
June - -	8 23 „	7 50 „
July - -	8 46 „	7 55 „
August - -	8 33 „	7 45 „
September -	8 33 „	8 20 „
October - -	8 18 „	7 5 „
November -	9 4 „	8 18 „
December -	8 9 „	7 32 „
Year - -	8 38 a.m.	7 51 p.m.

The times at which the sea temperature is at its mean daily value, throughout the year, vary as follows :—

Between 8 8 a.m. in May and 9 9 a.m. in February = 1 hour 1 minute range.
Between 7 5 p.m. in October and 8 20 p.m. in September = 1 hour 15 minutes range.

The time *above* the mean for six consecutive months is longest from April to September, when it averages 11 hours 28 minutes; for the other half of the year it averages 11 hours 6 minutes. The interval above the mean is in defect of that below throughout the year. For the whole year the time *above* the mean is *11 hours 13 minutes.

and differ slightly from the arithmetical mean of the 12 months.

TABLE V.—SEA TEMPERATURE.

SQUARE 3.—NORTHERN HALF.
Lat. 5° to 10° N. Long. 20° to 30° W.

ABSOLUTE MAXIMA and MINIMA SEA TEMPERATURES with EXTENT of RANGE, obtained from the Individual Observations collected for the several Four-Hourly Means used in the present Discussion.

Month.	Mean Monthly Values.	Hour.	Maximum.	Hour.	Minimum.	Range.
January	78°·9	{ Noon 4 p.m. }	82°·0	{ 4 a.m. 8 a.m. }	74°·4	7°·6
February	78°·5	{ Noon 4 p.m. }	81°·2	{ 4 a.m. 8 p.m. }	74°·7	6°·5
March	79°·1	4 p.m.	82°·8	Midt. 8 a.m.	74°·5	8°·3
April	79°·0	Noon.	82°·5	4 a.m.	72°·5	10°·0
May	80°·0	Noon.	83°·5	{ 4 a.m. 8 a.m. }	75°·0	8°·5
June	80°·3	Noon.	83°·0	Midt.	75°·2	7°·8
July	79°·8	Noon.	82°·2	4 a.m.	76°·5 r	5°·7
August	79°·3	Noon.	81°·8	4 a.m.	77°·0	4°·8
September	80°·5	{ Noon. 4 p.m. }	83°·0	4 a.m.	76°·5	6°·5
October	81°·2	Noon.	85°·5	4 a.m.	78°·0 r	7°·5
November	81°·3	Noon.	84°·0	{ 4 a.m. 4 p.m. 8 p.m. }	79°·0 r	5°·0
December	80°·3	{ Noon. 4 p.m. }	82°·6	{ 4 a.m. 8 a.m. }	76°·7	5°·9
Year	79°·8	Noon.	85°·5	4 a.m.	72°·5	13°·0

The letter r given with the Minimum Temperature

TABLE V.—SEA TEMPERATURE.

SQUARE 3.—SOUTHERN HALF.
Lat. 0° to 5° N. Long. 20° to 30° W.

ABSOLUTE MAXIMA and MINIMA SEA TEMPERATURES with EXTENT of RANGE, obtained from the Individual Observations collected for the several Four-Hourly Means used in the present Discussion.

Month.	Mean Monthly Values.	Hour.	Maximum.	Hour.	Minimum.	Range.
January	79°·7	Noon.	83°·0	Midt.	76°·0 r	7°·0
February	80°·8	4 p.m.	84°·0	{ 4 a.m. 4 a.m. }	77°·0 r	7°·0
March	81°·2	4 p.m.	85°·0	{ 8 a.m. 4 p.m. }	77°·4	7°·6
April	81°·4	4 p.m.	84°·5	4 a.m.	78°·0	6°·5
May	81°·5	{ Noon. 4 p.m. }	85°·0	4 a.m.	77°·0	8°·0
June	80°·3	{ Noon. 4 p.m. }	83°·0	{ 4 a.m. 8 a.m. }	74°·0	9°·0
July	78°·8	4 p.m.	82°·0	4 a.m.	74°·5	7°·5
August	77°·3	Noon.	81°·0	Midt.	72°·5	8°·5
September	78°·7	4 p.m.	82°·0	Midt.	74°·0	8°·0
October	80°·0	{ Noon. 4 p.m. }	83°·2	4 a.m.	76°·5	6°·7
November	79°·9	4 p.m.	83°·0	{ 8 a.m. Midt. }	75°·0	8°·0
December	79°·8	Noon.	82°·5	{ 4 a.m. 8 a.m. Midt. }	76°·5	6°·0
Year	80°·0	{ Noon. 4 p.m. }	85°·0	Midt.	72°·5	12°·5

shows that rain was falling at time of observation.

From the values given in Tables 2, 3, and 4, the curves of Diurnal Pressure and Temperature are drawn.

As explained at the foot of the Diagrams, the figures at the normal line for each set of curves show the mean pressure or temperature for each month, which combined with the value shown by the curves at any hour give the readings at that hour.

The yearly results of Diurnal Range of pressure and temperature for the Northern and Southern halves of the Square agree in a very remarkable manner; they may in fact be considered identical. This agreement might probably have been expected when we consider that in the course of the year the two halves experience very similar meteorological conditions though in different months.

The Doldrum traverses the Square twice in the year, keeping within the 10° limit, except in the months of July and August when it extends slightly to the Northward of Square 3. It is about an equal time in each half of the square. The least mean force of wind, the largest amount of cloud, and the least difference of dry and damp bulbs agree in placing the Doldrum in the Northern half from June to November, and in the Southern half during the other six* months of the year.

The following Table may be useful in connection with the Diurnal Range Tables.

Month.	Northern half of Square 3.			Southern half of Square 3.		
	Mean Force of Wind.	Mean Amount of Cloud.	Mean Difference of Dry and Damp Bulbs.	Mean Force of Wind.	Mean Amount of Cloud.	Mean Difference of Dry and Damp Bulbs.
January - -	3·8	5·6	0·8	2·5	6·6	0·9
February - -	4·1	4·9	4·2	2·5	6·4	3·4
March - - -	3·7	4·7	4·1	2·4	6·1	3·6
April - - -	3·6	4·4	4·1	2·3	6·1	3·3
May - - -	3·2	5·7	3·7	2·5	6·2	3·4
June - - -	2·4	6·4	3·4	3·7	4·9	3·7
July - - -	3·3	6·8	3·4	4·2	4·4	4·1
August - - -	3·9	6·6	3·4	4·1	4·3	4·0
September - -	2·9	6·1	3·3	3·9	4·9	3·9
October - - -	2·4	6·0	3·3	3·7	5·2	3·7
November - -	2·8	6·4	3·3	3·6	5·3	3·4
December - -	3·2	6·0	3·6	3·2	5·7	3·3
Year - - -	3·3	5·8	3·6	3·2	5·5	3·6

The mean for the six months during which the Doldrum exists in each half shows an equally good agreement.

				Mean Force of Wind.	Mean Amount of Cloud.	Mean Difference of Dry and Damp Bulbs.
Nn. half of Square, June to November - - - -				3·0	6·4	0·3
Sn. half of Square, December to May - - - -				2·6	6·2	3·3

* In December the Doldrum extends as much into the Northern half as into the Southern half of the Square, but it has been dealt with as being in the Southern half.

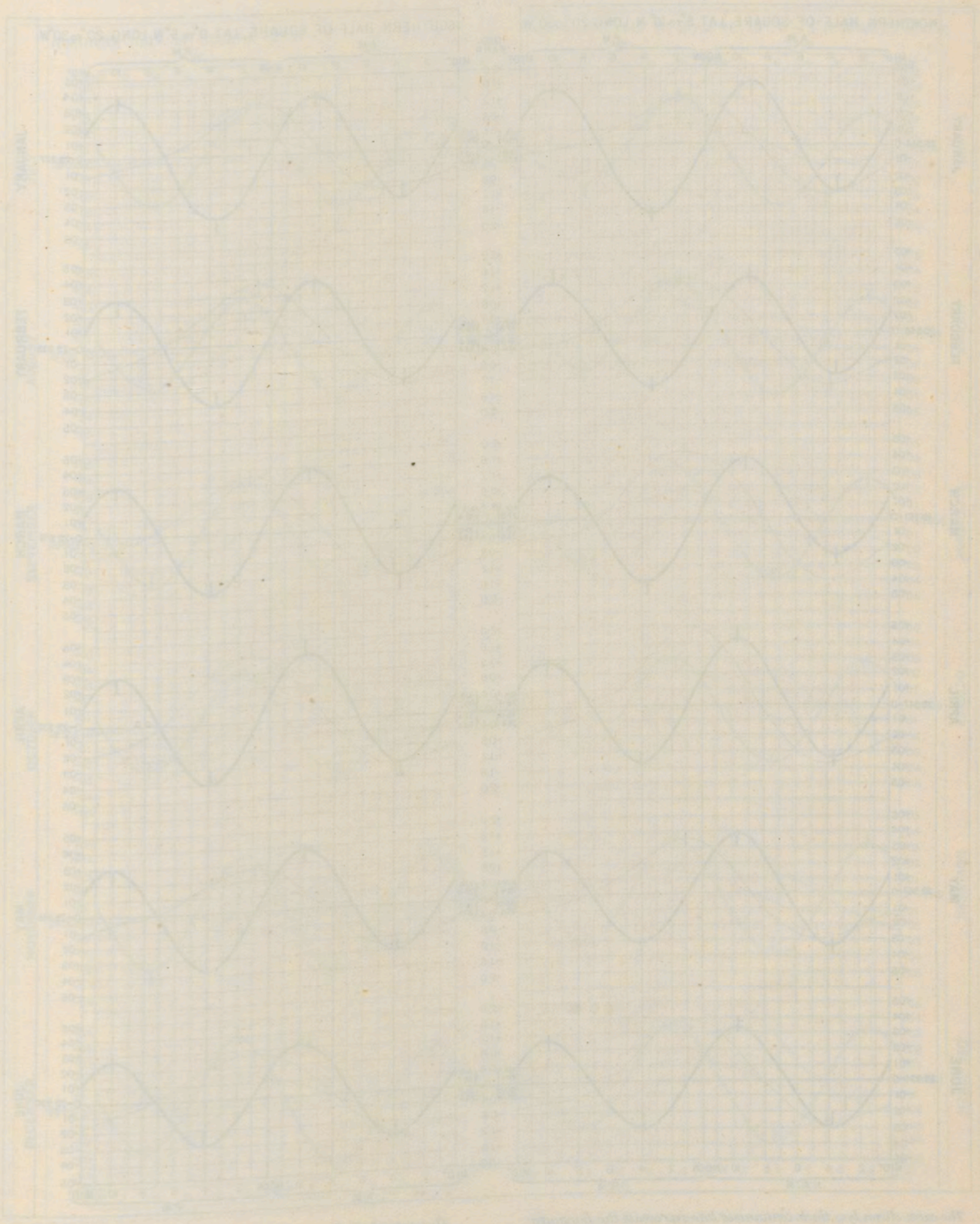
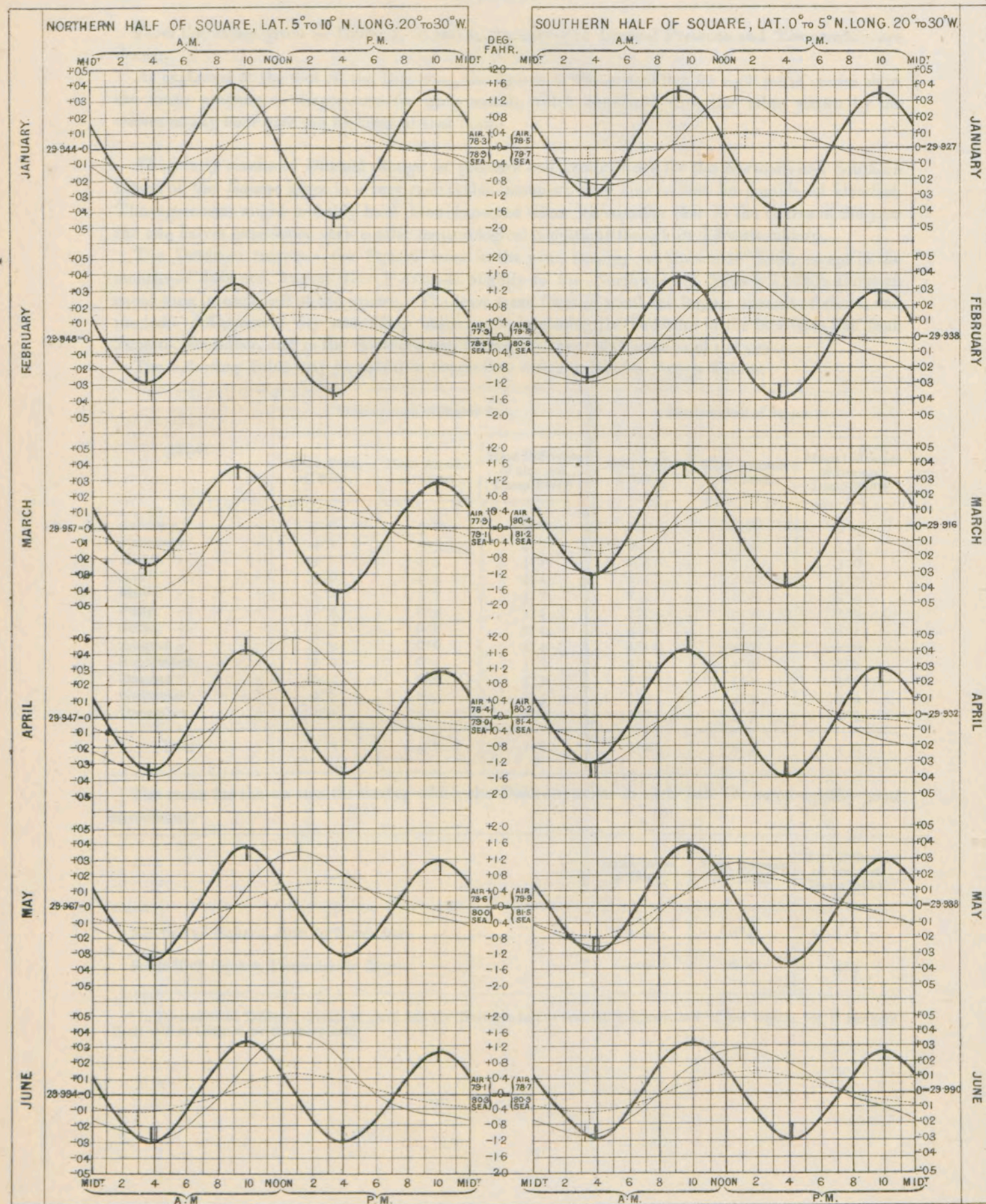


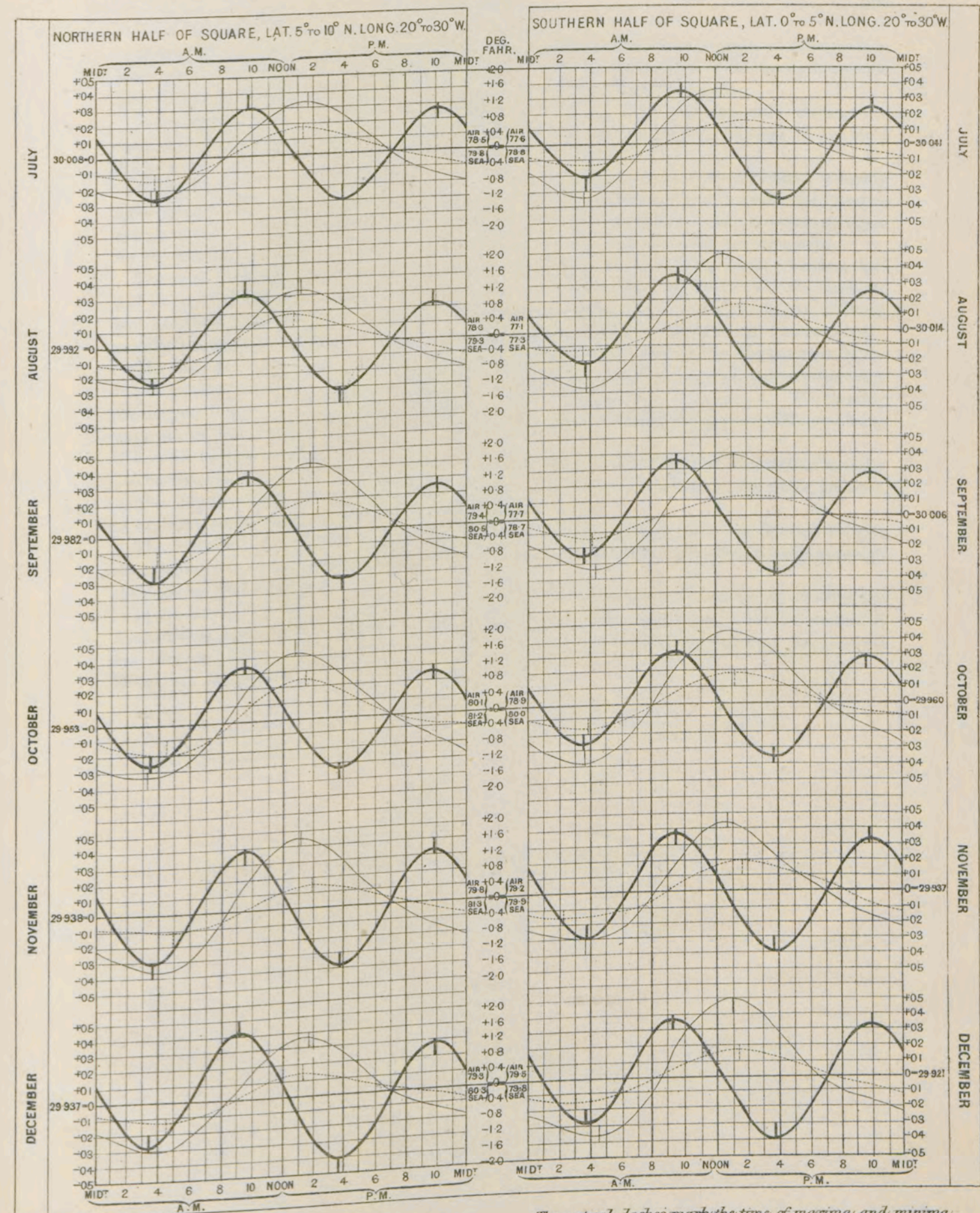
Diagram 2.
Appendix A.
Back to P. 298.
DIURNAL RANGE OF BAROMETER AND OF AIR AND SEA TEMPERATURES IN SQUARE 3.



The curve shown by a thick continuous line represents the Barometer.
The curve shown by a thin continuous line represents the Air Temperature.
The curve shown by a broken line represents the Sea Temperature.

The vertical dashes mark the time of maxima and minima.
The figures at the normal line for each set of curves show the mean Monthly value.

Diagram 3.
Appendix A.
To face Diagram 2.
DIURNAL RANGE OF BAROMETER AND OF AIR AND SEA TEMPERATURES IN SQUARE 3.



The curve shown by a thick continuous line represents the Barometer.
The curve shown by a thin continuous line represents the Air Temperature.
The curve shown by a broken line represents the Sea Temperature.

The vertical dashes mark the time of maxima and minima.
The figures at the normal line for each set of curves show the mean Monthly value.

Table III. Barometer in this Appendix shows that the greatest diurnal range of pressure is in the period from November to April in both the Northern and Southern halves of Square 3, though the hygrometrical conditions of the air at this time in the two halves differ very much.

A comparison with Table III. Air Temperature, however, shows that the daily extremes of temperature are greatest when the amount of cloud is least and the relative dryness of the air is greatest.

Tables V. give the extremes of Pressure and Temperature obtained from the individual 4-hourly observations. They show the absolute range to be extremely small throughout the year, the Pressure averaging $\cdot 271$ in. in the Northern half, and $\cdot 252$ in. in the Southern half; whilst the extreme range for the year only amounts to $\cdot 369$ in. in the Northern half, and $\cdot 413$ in. in the Southern half.

The mean absolute Range of Air Temperature in the twelve months is $12^{\circ} \cdot 2$ in the Northern half and $11^{\circ} \cdot 3$ in the Southern, whilst the extreme range for the year amounts to $15^{\circ} \cdot 9$ in the Northern half and $16^{\circ} \cdot 7$ in the Southern half. The extreme temperatures vary but slightly in the different months, the difference never amounting to 5° except in the case of the maxima for the Southern half.

The absolute Range of Sea Temperature is considerably less than that of the Air, the mean in the twelve months being only $7^{\circ} \cdot 0$ in the Northern half and $7^{\circ} \cdot 5$ in the Southern half, the extreme range for the year is $13^{\circ} \cdot 0$ in the Northern half and $12^{\circ} \cdot 5$ in the Southern half of Square 3. The monthly extremes of Sea Temperature vary rather more than those of the air, the greatest difference being $6^{\circ} \cdot 5$ in the minima for the Northern half.

The Diurnal Range of Pressure in Square 3 is so regular that the individual observations in really reliable logs never fail to show it, the amount is, however, often much affected by the ship's progress, as explained in the commencement of this Appendix.

The individual observations of Air Temperature do not so regularly show the Diurnal Range; since, falling rain or a sudden freshening of the wind, &c., often produce changes which quite outweigh the ordinary Diurnal Range.

In the case of Sea Temperature, individual observations are still more irregular in showing the Diurnal Range, all traces being at times lost, owing to the ship's progress or other influences; it has, however, been shown that by grouping a number of observations together, the Diurnal Range can be deduced.

APPENDIX B.

APPENDIX B. contains an abstract of the wind data for SQUARE 39, which lies immediately to the northward of Square 3. (See its position on the lower left-hand corner of each Chart.)

This abstract has been given to render the Paper on Square 3 more complete. The data of Square 39 will eventually be published in a more detailed form.

The observations are sifted into strips of 2° of latitude by 5° of longitude, by which means the Direction and Mean Force of Winds in the En. and Wn. halves of the Square can be compared, the chief object being to show whether an *Outward-bound* Ship should pass to the Ed. or Wd. of the Cape Verd Islands.

A Table is given for each month, which contains the Number of Observations, Mean Force of all Winds, Percentage and Mean Force of Wind from each *quarter*, as well as of Variables, also the Percentage of Calms.

This Appendix has been compiled to aid in drawing up the recommendations as to the Best Routes across the Equator, but it has been deemed advisable to print it, that the Navigator may have the opportunity for forming an independent judgment; which judgment will be much aided by comparing the Table of this Appendix for a given month with Table 12 for the same month given in the body of the Paper; for Table 12 gives the three points of each quarter of the compass from which the wind *prevails* in each half of Square 39, and proves that the wind is generally more Easterly on the Western than on the Eastern side of the Cape Verd Islands, whilst this Appendix shows that it is also generally stronger on their Western side.

SQUARE 39.—JANUARY.

WESTERN HALF.										EASTERN HALF.									
Position.	No. of Observations.	Mean Force.	N. to E. N. E. to S. E. or S. Ely.			S. to W. b. S. or S. Wly.			W. to N. W. or N. Wly.			Variables.			Calms.				
			Mean Force.	%	Mean Force.	%	Mean Force.	%	Mean Force.	%	Mean Force.	%							
Lat. 18° to 20° N. Long. 25° to 30° W.	420	5° 0	72	5° 2	21	5° 1	1	3° 0	3	3° 0	2	4° 5	1	—	—				
Lat. 16° to 18° N. Long. 25° to 30° W.	426	4° 9	78	5° 1	18	4° 6	—	—	2	3° 0	1	5° 0	1	—	—				
Lat. 14° to 16° N. Long. 25° to 30° W.	434	5° 0	83	5° 0	16	5° 2	—	—	1	1° 0	—	—	—	—	—				
Lat. 12° to 14° N. Long. 25° to 30° W.	429	4° 8	87	4° 9	12	4° 6	—	—	1	3° 0	—	—	—	—	—				
Lat. 10° to 12° N. Long. 25° to 30° W.	474	4° 7	90	4° 8	10	4° 5	—	—	—	—	—	—	—	—	—				

Position.	No. of Observations.	Mean Force.	N. to E. N. E. to S. E. or S. Ely.			Position.	No. of Observations.	Mean Force.	N. to E. N. E. to S. E. or S. Ely.			S. to W. b. S. or S. Wly.			W. to N. W. or N. Wly.			Variables.	Calms.
			Mean Force.	%	Mean Force.				%	Mean Force.	%	Mean Force.	%	Mean Force.	%	Mean Force.	%		
Lat. 18° to 20° N. Long. 20° to 25° W.	69	4° 7	67	5° 1	22	4° 7	—	—	6	5° 3	4	2° 0	1	—	—	—	—		
Lat. 16° to 18° N. Long. 20° to 25° W.	45	5° 3	78	5° 3	20	5° 8	2	2° 0	—	—	—	—	—	—	—	—	—		
Lat. 14° to 16° N. Long. 20° to 25° W.	49	4° 9	96	4° 8	4	6° 0	—	—	—	—	—	—	—	—	—	—	—		
Lat. 12° to 14° N. Long. 20° to 25° W.	47	5° 0	83	5° 0	9	5° 0	—	—	8	4° 3	—	—	—	—	—	—	—		
Lat. 10° to 12° N. Long. 20° to 25° W.	62	4° 8	95	4° 8	3	4° 5	—	—	2	4° 0	—	—	—	—	—	—	—		

SQUARE 39.—FEBRUARY.

Lat. 18° to 20° N. Long. 20° to 25° W.	59	4° 3	87	4° 3	1	5° 0	—	8	3° 7	—	3° 3	—
Lat. 16° to 18° N. Long. 20° to 25° W.	64	3° 9	80	4° 1	8	3° 4	6	2° 0	—	6	4° 0	—
Lat. 14° to 16° N. Long. 20° to 25° W.	63	4° 1	95	4° 2	3	4° 5	—	—	—	—	2	—
Lat. 12° to 14° N. Long. 20° to 25° W.	66	4° 6	92	4° 6	2	5° 0	—	—	4° 0	—	—	—
Lat. 10° to 12° N. Long. 20° to 25° W.	67	4° 6	96	4° 6	—	—	—	4° 3	—	—	—	—

SQUARE 39.—MARCH.

Lat. 18° to 20° N. Long. 20° to 25° W.	56	4° 6	88	4° 8	1	2° 0	5	2° 9	5	2° 9	1	2° 0	—
Lat. 16° to 18° N. Long. 20° to 25° W.	67	4° 8	94	4° 9	2	4° 0	—	—	1	4° 0	2	3° 0	1
Lat. 14° to 16° N. Long. 20° to 25° W.	74	4° 1	85	4° 5	—	—	—	—	6	2° 3	8	1° 8	1
Lat. 12° to 14° N. Long. 20° to 25° W.	78	4° 1	87	4° 2	3	3° 0	—	—	10	3° 5	—	—	—
Lat. 10° to 12° N. Long. 20° to 25° W.	417	3° 6	80	3° 8	7	5° 0	—	—	8	2° 8	2	1° 8	3

SQUARE 39.—APRIL.

WESTERN HALF.												EASTERN HALF.											
Position.	No. of Observations.	Mean Force.	N. to E. N. E. to S. E. or S. Ely.			S. to W. W. S. to N. W. or S. Wly.			W. to N. W. or S. Wly.			Variables.	Calms.										
			Mean Force.	%	Mean Force.	%	Mean Force.	%	Mean Force.	%													
Lat. 18° to 20° N. Long. 25° to 30° W.	90	4° 4	92	4° 6	5	3° 5	—	—	1	2° 0	—	2	—	—									
Lat. 16° to 18° N. Long. 25° to 30° W.	418	4° 4	92	4° 4	5	4° 1	1	1° 0	—	—	2	1° 5	—	—									
Lat. 14° to 16° N. Long. 25° to 30° W.	416	3° 7	81	4° 1	10	3° 4	1	1° 5	1	2° 0	4	1° 9	3	—									
Lat. 12° to 14° N. Long. 25° to 30° W.	97	3° 9	90	4° 1	5	3° 4	2	1° 0	1	5° 0	1	1° 0	1	—									
Lat. 10° to 12° N. Long. 25° to 30° W.	83	4° 0	91	4° 1	6	3° 0	—	—	1	3° 0	2	3° 0	—	—									
	</																						

SQUARE 39.—MAY.

Lat. 18° to 20° N. Long. 20° to 25° W.	400	4° 4	91	4° 4	3	4° 5	1	6° 0	4	3° 3	1	2° 0	—
Lat. 16° to 18° N. Long. 20° to 25° W.	403	4° 5	93	4° 5	4	4° 6	—	—	2	1° 5	—	—	4
Lat. 14° to 16° N. Long. 20° to 25° W.	403	4° 4	96	4° 4	3	3° 4	—	—	1	1° 5	—	—	2
Lat. 12° to 14° N. Long. 20° to 25° W.	400	4° 1	92	4° 1	6	3° 5	—	—	1	2° 8	1	3° 5	—
Lat. 10° to 12° N. Long. 20° to 25° W.	402	4° 1	91	4° 2	4	3° 7	—	—	3	3° 3	2	3° 2	2

SQUARE 39.—JUNE.

Lat. 18° to 20° N. Long. 20° to 25° W.	406	4° 5	97	4° 6	1	4° 8	—	—	1	3° 0	1	3° 0	—
Lat. 16° to 18° N. Long. 20° to 25° W.	404	4° 4	91	4° 5	7	3° 7	—	—	0	3° 0	1	3° 0	—
Lat. 14° to 16° N. Long. 20° to 25° W.	409	4° 0	88	4° 2	8	3° 3	—	—	1	2° 0	2	2° 9	16
Lat. 12° to 14° N. Long. 20° to 25° W.	399	3° 7	87	3° 8	10	3° 9	—	—	2	3° 2	1	3° 5	2
Lat. 10° to 12° N. Long. 20° to 25° W.	402	3° 4	79	3° 6	9	3° 5	1	2° 0	6	3° 7	4	2° 4	4

SQUARE 39.—JULY.

WESTERN HALF.										EASTERN HALF.																		
Position.	No. of Observations.	N. to E. N. E. to S. E. S. to W. W. S. to N. W. W. or N. W. W. or N. W. W.			Variables.			Calms.	Position.	No. of Observations.	Mean Force.			N. to E. N. E. to S. E. S. to W. W. S. to N. W. W. or N. W. W. or N. W. W.			Variables.			Calms.								
		Mean Force.	%	Mean Force.	%	Mean Force.	%				Mean Force.	%	Mean Force.	%	Mean Force.	%	Mean Force.	%	Mean Force.		%							
Lat. 18° to 20° N. Long. 25° to 30° W.	507	4'5	93	4'3	6	4'3	—	—	1	7'0	—	—	—	—	Lat. 18° to 20° N. Long. 20° to 25° W.	411	3'8	68	4'1	11	3'5	4	1'8	16	3'3	1	1'0	—
Lat. 16° to 18° N. Long. 25° to 30° W.	513	4'2	84	4'4	10	3'6	0	1'0	2	1'9	2	4'1	2	Lat. 16° to 18° N. Long. 20° to 25° W.	94	2'7	55	3'1	5	3'4	8	2'6	18	2'9	10	1'2	4	
Lat. 14° to 16° N. Long. 25° to 30° W.	468	3'6	71	3'8	16	3'6	1	3'6	6	2'5	4	2'8	2	Lat. 14° to 16° N. Long. 20° to 25° W.	67	3'2	54	3'0	2	3'5	4	2'8	31	4'1	6	2'5	3	
Lat. 12° to 14° N. Long. 25° to 30° W.	626	2'9	63	3'3	14	2'8	4	3'1	12	2'5	2	2'0	5	Lat. 12° to 14° N. Long. 20° to 25° W.	222	2'8	39	3'1	6	2'6	13	2'7	36	2'9	3	1'4	3	
Lat. 10° to 12° N. Long. 25° to 30° W.	677	2'7	40	3'0	13	2'7	19	3'2	15	2'7	6	2'2	7	Lat. 10° to 12° N. Long. 20° to 25° W.	322	2'6	26	2'5	6	2'6	29	3'2	24	2'6	12	1'9	3	

SQUARE 39.—AUGUST.

Lat. 18° to 20° N. Long. 25° to 30° W.	228	4'2	91	4'3	7	4'1	—	—	1	3'0	1	4'0	0	—	—	—	—	—	—	—	—	2
Lat. 16° to 18° N. Long. 25° to 30° W.	312	3'8	76	4'1	12	3'8	3	2'8	4	2'6	2	3'0	3	3'6	69	4'0	8	2'1	8	2'6	13	2
Lat. 14° to 16° N. Long. 25° to 30° W.	323	3'3	53	3'7	17	3'2	10	3'7	11	2'7	5	2'0	4	3'2	30	3'8	7	2'7	24	4'4	28	7
Lat. 12° to 14° N. Long. 25° to 30° W.	627	2'7	34	3'2	12	2'7	22	3'2	18	2'9	5	1'6	9	3'4	18	3'2	6	4'8	40	3'7	29	3
Lat. 10° to 12° N. Long. 25° to 30° W.	448	3'2	19	2'9	8	3'0	44	3'7	19	3'2	5	2'3	5	3'0	11	2'5	5	2'1	44	4'0	29	8

SQUARE 39.—SEPTEMBER.

Lat. 18° to 20° N. Long. 25° to 30° W.	493	4'2	80	4'5	10	4'2	1	1'7	5	2'9	1	3'3	3	4'3	88	4'2	7	4'7	—	—	3	4'5	2
Lat. 16° to 18° N. Long. 25° to 30° W.	329	4'2	70	4'5	21	3'9	2	4'1	4	3'1	2	1'6	1	3'6	47	4'4	28	3'1	6	3'2	6	3'0	2
Lat. 14° to 16° N. Long. 25° to 30° W.	442	3'7	71	3'8	17	3'5	4	4'2	3	4'3	2	2'2	3	2'9	85	3'1	9	3'4	26	3'3	16	3'5	7
Lat. 12° to 14° N. Long. 25° to 30° W.	477	3'1	42	3'6	17	3'5	11	3'2	21	2'8	4	2'2	5	2'8	21	3'3	7	3'0	36	3'1	22	2'8	4
Lat. 10° to 12° N. Long. 25° to 30° W.	429	3'0	29	3'1	14	2'8	30	3'6	16	3'3	4	1'7	7	2'8	18	2'6	6	2'3	39	3'4	22	2'8	7

SQUARE 39.—OCTOBER.

WESTERN HALF.												EASTERN HALF.													
Position.	No. of Observations.	N. to E. N. E. to S. E. S. to W. W. S. to N. W. W. or N. W. W. or N. W. W.			Variables.			Calms.	Position.	No. of Observations.	N. to E. N. E. to S. E. S. to W. W. S. to N. W. W. or N. W. W. or N. W. W.			Variables.			Calms.								
		Mean Force.	%	Mean Force.	%	Mean Force.	%				Mean Force.	%	Mean Force.	%	Mean Force.	%		Mean Force.	%						
Lat. 18° to 20° N. Long. 25° to 30° W.	288	4'5	82	4'6	15	4'3	1	2'8	—	—	1	3'5	1	3'9	84	4'3	3	2'5	2	1'1	7	2'2	2	2'3	2
Lat. 16° to 18° N. Long. 25° to 30° W.	298	4'5	83	4'7	13	3'6	3	3'3	—	—	—	—	1	3'9	88	4'0	5	4'4	—	—	—	—	4	4'0	3
Lat. 14° to 16° N. Long. 25° to 30° W.	360	4'2	81	4'3	14	4'1	0	2'5	1	2'2	3	2'6	1	3'9	92	4'0	3	4'0	—	—	1	1'0	2'8	—	
Lat. 12° to 14° N. Long. 25° to 30° W.	444	3'8	64	4'1	26	3'7	1	3'6	1	2'7	6	2'9	2	2'9	70	3'2	8	3'1	3	1'8	10	2'5	4	1'7	5
Lat. 10° to 12° N. Long. 25° to 30° W.	544	3'2	54	3'7	22	3'2	9	3'2	5	2'4	5	2'2	5	2'5	53	3'0	14	3'1	8	2'8	10	2'0	5	1'7	10

SQUARE 39.—NOVEMBER.

Lat. 18° to 20° N. Long. 25° to 30° W.	453	4'1	71	4'1	25	4'0	1	4'0	3	5'3	—	—	—	423	3'8	80	4'0	1	5'0	10	3'0	6	3'6	—	3	
Lat. 16° to 18° N. Long. 25° to 30° W.	296	3'6	63	4'0	21	3'9	6	2'1	4	2'8	1	3'5	5	71	3'8	85	3'9	6	4'6	1	1'0	7	2'3	1	3'5	—
Lat. 14° to 16° N. Long. 25° to 30° W.	293	4'1	72	4'1	25	4'0	1	3'8	1	3'5	1	2'0	—	69	2'9	60	4'2	9	2'3	7	1'4	7	1'8	—	17	
Lat. 12° to 14° N. Long. 25° to 30° W.	320	3'9	72	4'1	23	3'8	2	1'6	1	2'4	2	1'8	0	75	3'9	86	4'0	8	3'3	1	5'0	5	3'4	—	—	
Lat. 10° to 12° N. Long. 25° to 30° W.	316	3'8	72	4'0	20	4'0	1	1'8	1	2'0	3	3'1	3	419	3'8	91	3'9	5	2'5	—	—	2	3'0	1	1'5	1

SQUARE 39.—DECEMBER.

Lat. 18° to 20° N. Long. 25° to 30° W.	420	4'7	54	4'9	40	4'8	—	—	2	3'7	2	5'5	2	Lat. 18° to 20° N. Long. 20° to 25° W.	400	3'9	74	4'2	5	5'2	9	1'9	8	2'7	4	2'0	—
Lat. 16° to 18° N. Long. 25° to 30° W.	438	4'4	61	4'6	30	4'7	1	2'0	1	3'0	6	2'3	1	Lat. 16° to 18° N. Long. 20° to 25° W.	93	3'5	58	4'6	17	3'3	12	1'7	4	2'1	—	1'3	—
Lat. 14° to 16° N. Long. 25° to 30° W.	445	4'8	70	4'8	30	4'9	—	—	—	—	—	—	—	Lat. 14° to 16° N. Long. 20° to 25° W.	94	3'5	70	4'3	8	4'5	—	—	7	1'6	—	15	—
Lat. 12° to 14° N. Long. 25° to 30° W.	450	4'6	81	4'6	19	4'5	—	—	—	—	—	—	—	Lat. 12° to 14° N. Long. 20° to 25° W.	400	3'9	79	4'2	5	3'4	—	—	14	2'5	2	3'5	—
Lat. 10° to 12° N. Long. 25° to 30° W.	464	4'6	91	4'6	8	4'5	—	—	—	—	—	—	1	Lat. 10° to 12° N. Long. 20° to 25° W.	98	4'2	93	4'2	6	4'5	—	—	1	3'5	—	—	—

APPENDIX C.

This Appendix gives an abstract of the wind data for the En. half of SQUARE 303, which contains Cape St. Roque, and is therefore a very important square to Navigators. (See its position on the lower left-hand corner of each Chart.)

As in the case of Appendix B., this abstract has been given to render the Paper on Square 3 more complete. The data of Square 303 will eventually be published in another form.

The observations are sifted into strips of 1° of Latitude by 3° of Longitude between 30° and 33° W., and of 1° of Latitude by 2° of Longitude between 33° and 35° W.; this is done to enable the Navigator to judge whether the wind is stronger or more favourable within or beyond 2° from the land.

A Table is given for each month, which contains the Number of Observations, Mean Force of all Winds, the Percentage and Mean Force of Wind from each *point*, as well as of Variables; also the Percentage of Calms.

If the Navigator will run pencil lines through the En. and Wn. parts of each Table, making them cut the largest percentages for each degree of latitude, he will find that the relative positions of the lines will show at once which part has the most favourable winds for his route, whilst a comparison of their first columns shows which has the stronger wind. By this means it is shown that in January the wind is slightly more Ely. between 33° and 35° W. than between 30° and 33° W., but that the Eastern part has *stronger* winds than the Western; a similar conclusion is given for each month in the Paper.

This Appendix, like Appendix B., has been consulted in drawing up the advice as to the Best Routes across the Equator, but it is believed that the Navigator will find advantage in consulting the Tables for himself.

SQUARE 303 -

WESTERN PART.—LONGITUDE 33° to 35° W.

Position.	Total Observations and Mean Force.	% of Observations and Mean Force on each Point.	N.	N. by E.	N.N.E.	N.E. by N.	N.E.	N.E. by E.	E.N.E.	E. by N.	E.	E. by S.	E.S.E.	S.E. by E.	S.E.	S.E. by S.	S.S.E.	S. by E.	S.	S. by W.	S.S.W.	S.W. by S.	S.W.	S.W. by W.	W.S.W.	W. by S.	W.	W. by N.	W.N.W.	N.W. by W.	N.W.	N.W. by N.	N.N.W.	N. by W.	Variables.	Calm.	
			%	6	6	25	19	13	.	.	.	6	6	19
Lat. 0° to 1° S.	16	%	6	6	25	19	13	.	.	.	6	6	19
Long. 33° to 35° W.	17	Mean force	4°	1°	3°	1°	3°	2°	5°	.	1°	0°	0°	5°
Lat. 1° to 2° S.	6	%	33	33	17	17
Long. 33° to 35° W.	33	Mean force	.	.	.	.	.	.	.	.	.	2°	3°	8°	4°	4°	0°	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Lat. 2° to 3° S.	7	%	.	.	.	.	.	.	.	.	.	14	43	14	29	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Long. 33° to 35° W.	41	Mean force	.	.	.	.	.	.	.	.	.	3°	5°	4°	4°	4°	5°	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Lat. 3° to 4° S.	10	%	.	.	.	.	.	.	.	10	.	20	20	20	10	.	10	10	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Long. 33° to 35° W.	41	Mean force	.	.	.	.	.	.	.	3°	5°	5°	0°	4°	5°	3°	3°	4°	0°	4°	0°	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Lat. 4° to 5° S.	24	%	.	.	.	.	.	.	.	.	4	8	13	8	17	25	21	.	4	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Long. 33° to 35° W.	41	Mean force	.	.	.	.	.	.	.	3°	0°	4°	5°	4°	7°	4°	3°	3°	9°	3°	8°	4°	4°	0°	.	.	.	.	.	.	.	.	.	.	.
Lat. 5° to 6° S.	35	%	.	.	.	.	.	.	.	5	6	3	11	26	6	6	17	14	.	3	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	3
Long. 33° to 35° W.	38	Mean force	.	.	.	.	.	.	.	2°	0°	2°	5°	2°	0°	3°	3°	4°	0°	4°	8°	5°	0°	4°	3°	4°	6°	.	4°	5°	.	.	.	.	.	.
Lat. 6° to 7° S.	46	%	.	.	.	.	.	4	.	.	2	2	9	15	20	18	18	4	.	4	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Long. 33° to 35° W.	37	Mean force	1°	8°	.	1°	0°	4°	5°	3°	8°	4°	3°	8°	3°	8°	4°	1°	3°	5°	.	2°	0°	2°	8°
Lat. 7° to 8° S.	55	%	2	5	13	22	16	24	13
Long. 33° to 35° W.	42	Mean force	.	.	.	.	.	.	.	3°	0°	3°	3°	3°	9°	4°	3°	4°	7°	4°	3°	3°	9°	4°	7°	.	.	.	.	.	.	.	.	.	.	.
Lat. 8° to 9° S.	63	%	.	2	.	.	2	2	2	8	9	9	30	22	8	2	3	1
Long. 33° to 35° W.	40	Mean force	.	5°	0°	.	3°	0°	3°	5°	4°	0°	4°	1°	4°	5°	4°	3°	8°	3°	7°	1°	0°	3°	5°	.	.	.	.	.	.	.	.	.	.	.
Lat. 9° to 10° S.	31	%	.	.	.	2	.	.	6	10	10	4	27	13	8	4	4	2	.
Long. 33° to 35° W.	43	Mean force	.	.	.	5°	0°	.	3°	7°	3°	5°	4°	0°	3°	9°	4°	7°	4°	5°	5°	0°	4°	0°	4°	4°	0°

SQUARE 303 -

WESTERN PART.—LONGITUDE 33° to 35° W.

Lat. 0° to 1° S.	7	%	14	.	14	72
Long. 33° to 35° W.	2'9	Mean force	.	.	.	.	3'0	.	5'0	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	2'5
Lat. 1° to 2° S.	3	%	34	33	33
Long. 33° to 35° W.	3'3	Mean force	.	.	.	.	.	.	.	.	.	4'0	4'0	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	2'0
Lat. 2° to 3° S.	4	%	50	50
Long. 33° to 35° W.	4'5	Mean force	.	.	.	.	.	.	.	.	.	4'5	4'5	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Lat. 3° to 4° S.	3	%	.	.	.	.	.	.	.	.	67	.	.	.	33	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Long. 33° to 35° W.	5'0	Mean force	.	.	.	.	.	.	.	.	5'0	.	.	.	5'0	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Lat. 4° to 5° S.	5	%	.	.	.	.	.	.	.	.	40	.	60	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Long. 33° to 35° W.	4'6	Mean force	.	.	.	.	.	.	.	.	4'0	.	5'0	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Lat. 5° to 6° S.	6	%	.	.	.	.	.	.	.	.	17	16	17	33	17	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Long. 33° to 35° W.	4'6	Mean force	.	.	.	.	.	.	.	.	5'0	5'0	4'0	4'0	5'5	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Lat. 6° to 7° S	15	%	.	.	.	.	.	.	.	.	13	20	7	33	27	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Long. 33° to 35° W.	4'5	Mean force	.	.	.	.	.	.	.	.	5'3	3'7	3'0	4'5	5'3	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Lat. 7° to 8° S.	15	%	.	.	.	.	.	.	.	6	7	20	20	7	7	33	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Long. 33° to 35° W.	4'0	Mean force	.	.	.	.	.	.	.	3'5	5'0	3'8	4'0	4'0	4'0	4'0	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Lat. 8° to 9° S.	19	%	.	.	.	.	.	.	.	16	21	5	11	32	10	5	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Long. 33° to 35° W.	4'6	Mean force	.	.	.	.	.	.	.	4	3	4'0	5'0	5'5	4'4	5'6	0	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Lat. 9° to 10° S.	13	%	.	.	.	.	.	.	.	23	8	8	.	15	23	15	8	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Long. 33° to 35° W.	3'9	Mean force	.	.	.	.	.	.	.	3'7	5'0	4'0	.	3'5	3'7	4'5	4'0	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.

- JANUARY.

EASTERN PART.—LONGITUDE 30° to 33° W.

Position.	Total Observations and Mean Force.	% of Observations and Mean Force on each Point.	N.	N. by E.	N.N.E.	N.E. by N.	N.E.	N.E. by E.	E.N.E.	E. by N.	E.	E. by S.	E.S.E.	S.E. by E.	S.E.	S.E. by S.	S.S.E.	S. by E.	S.	S. by W.	S.S.W.	S.W. by S.	S.W.	S.W. by W.	W.S.W.	W. by S.	W.	W. by N.	W.N.W.	N.W. by W.	N.W.	N.W. by N.	N.N.W.	N. by W.	Variables.	Calm.		
			%	.	.	.	2	.	5	11	13	8	6	16	14	13	6	3	3
Lat. 0° to 1° S.	63	Mean force	.	.	.	4° 0	.	2° 3	2° 5	3° 1	2° 9	3° 4	3° 9	3° 0	4° 6	3° 8	1° 5	.
Long. 30° to 33° W.	3° 2		.	.	.	.	.	.	.	.	2	6	6	9	17	18	8	3	.	.	.	.	.	.	.	.	.	.	.	.	.	1	.	1	.	9	5
Lat. 1° to 2° S.	65	Mean force	3° 0	.	6° 0	.	2° 0	2° 4	.	.	2° 0	3° 5	4° 1	3° 9	4° 5	4° 5	3° 8	4° 0	.	.	.	.	.	.	.	.	.	.	.	.	.	2° 0	.	2° 0	.	1° 6	.
Long. 30° to 33° W.	3° 5		.	.	1	.	2	5	.	1	.	1	2	27	18	23	8	5	.	.	.	.	.	.	.	.	.	.	.	.	.	1	1	2	.	3	.
Lat. 2° to 3° S.	66	Mean force	.	.	2° 0	.	3° 5	2° 7	.	2° 5	.	4° 5	2° 0	3° 8	4° 3	4° 3	4° 6	4° 0	.	.	.	.	.	.	.	.	.	.	.	.	.	2° 0	2° 0	2° 0	.	2° 0	.
Long. 30° to 33° W.	3° 8		.	.	.	.	.	.	.	5	2	.	16	22	15	24	3	5	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	4	1
Lat. 3° to 4° S.	67	Mean force	.	.	.	.	.	.	.	.	3° 7	3° 5	.	4° 3	4° 2	4° 6	4° 7	5° 5	4° 3	.	.	.	.	.	.	.	.	2° 8	.	.	.	.	.	.	.	2° 0	.
Long. 30° to 33° W.	4° 2		.	.	.	.	.	.	.	2	2	6	9	23	20	19	2	3	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	4	5
Lat. 4° to 5° S.	64	Mean force	.	.	.	.	.	.	.	.	6° 0	4° 0	3° 9	4° 6	4° 1	4° 5	4° 2	5° 0	4° 0	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	2° 0	.
Long. 30° to 33° W.	4° 0		.	.	.	.	.	.	.	.	3	3	9	17	23	31	9	.	5	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Lat. 5° to 6° S.	65	Mean force	.	.	.	.	.	.	.	.	4° 8	4° 5	4° 3	4° 5	4° 4	4° 3	4° 9	.	4° 0	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Long. 30° to 33° W.	4° 4		.	.	.	.	.	.	.	.	2	2	3	3	10	15	30	23	8	2	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	2	.
Lat. 6° to 7° S.	60	Mean force	.	.	.	.	.	.	.	.	3° 0	5° 0	4° 3	4° 0	4° 2	4° 6	4° 9	4° 8	4° 6	7° 0	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	3° 0	.
Long. 30° to 33° W.	4° 6		.	.	.	.	.	.	.	.	2	3	2	4	.	11	16	32	21	7	2	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Lat. 7° to 8° S.	56	Mean force	.	.	.	.	.	.	.	.	3° 5	2° 5	5° 0	4° 3	.	3° 5	4° 7	4° 8	4° 8	4° 3	7° 0	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Long. 30° to 33° W.	4° 5		.	.	.	.	.	.	.	.	4	.	6	6	18	18	28	12	6	.	2	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Lat. 8° to 9° S.	50	Mean force	.	.	.	.	.	.	.	.	3° 5	.	4° 3	4° 0	4° 7	4° 1	4° 5	5° 2	4° 3	.	4° 0	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Long. 30° to 33° W.	4° 4		.	.	.	.	.	.	.	.	2	2	2	.	4	9	21	13	32	11	2	2	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Lat. 9° to 10° S.	53	Mean force	.	.	.	3° 0	5° 0	6° 0	.	.	2° 8	3° 8	4° 4	4° 9	4° 6	4° 9	4° 0	5° 0
Long. 30° to 33° W.	4° 5	

SQUARE 303 -

WESTERN PART.—LONGITUDE 33° to 35° W.

Position.	Total Observations and Mean Force.	% of Observations and Mean Force on each Point.	N.	N. by E.	N.N.E.	N.E. by N.	N.E.	N.E. by E.	E.N.E.	E. by N.	E.	E. by S.	E.S.E.	S.E. by E.	S.E.	S.E. by S.	S.S.E.	S. by E.	S.	S. by W.	S.S.W.	S.W. by S.	S.W.	S.W. by W.	W.S.W.	W. by S.	W.	W. by N.	W.N.W.	N.W. by W.	N.W.	N.W. by N.	N.N.W.	N. by W.	Variables.	Calm.	
Lat. 0° to 1° S.	3	%	.	.	.	.	33	.	.	.	67	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Long. 33° to 35° W.	4.7	Mean force	.	.	.	.	4.5	.	.	.	4.8	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Lat. 1° to 2° S.	4	%	.	.	.	.	75	.	.	.	25	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Long. 33° to 35° W.	4.0	Mean force	.	.	.	.	3.7	.	.	.	5.0	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Lat. 2° to 3° S.	6	%	.	.	.	.	33	17	50	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Long. 33° to 35° W.	4.3	Mean force	.	.	.	.	3.8	5.0	4.3	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Lat. 3° to 4° S.	7	%	.	.	.	.	29	14	57	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Long. 33° to 35° W.	4.1	Mean force	.	.	.	.	5.0	5.0	3.5	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Lat. 4° to 5° S.	6	%	.	.	.	.	17	33	33	.	17	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Long. 33° to 35° W.	4.3	Mean force	.	.	.	.	6.0	4.5	4.5	.	2.0	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Lat. 5° to 6° S.	12	%	.	.	.	.	8	34	8	17	8	8	17	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Long. 33° to 35° W.	4.5	Mean force	.	.	.	.	6.0	5.0	4.0	4.0	3.0	4.0	4.3	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Lat. 6° to 7° S.	28	%	.	.	.	.	4	14	4	21	4	14	7	11	4	3	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	11	3
Long. 33° to 35° W.	3.4	Mean force	.	.	.	.	3.0	4.5	1.0	3.7	2.0	3.3	4.0	3.7	4.0	4.0	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	2.7	.	
Lat. 7° to 8° S.	24	%	.	.	.	4	4	4	4	38	8	13	21	4	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Long. 33° to 35° W.	3.9	Mean force	.	.	.	3.0	3.0	6.0	6.5	3.6	4.0	4.3	3.4	4.0	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Lat. 8° to 9° S.	30	%	.	.	.	.	10	10	3	20	17	17	13	10	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Long. 33° to 35° W.	3.7	Mean force	.	.	.	.	1.3	5.2	6.0	4.0	3.4	4.1	3.0	3.8	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Lat. 9° to 10° S.	15	%	.	.	.	7	.	.	14	13	13	13	20	13	7	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Long. 33° to 35° W.	3.8	Mean force	.	.	.	2.0	.	.	4.8	3.0	4.3	3.5	4.0	4.0	4.0	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.

SQUARE 303 -

WESTERN PART.—LONGITUDE 33° to 35° W.

[illegible]

- MARCH.

EASTERN PART.—LONGITUDE 30° to 33° W.

Position.	Total Observations and Mean Force.	% of Observations and Mean Force on each Point.	N. by E.																S. by E.																Variables.	Calms.
			N.	N. by E.	N.N.E.	N.E. by N.	N.E.	N.E. by E.	E.N.E.	E. by N.	E.	E. by S.	E.S.E.	S.E. by E.	S.E.	S.E. by S.	S.S.E.	S. by E.	S.	S. by W.	S.S.W.	S.W. by S.	S.W.	S.W. by W.	W.S.W.	W. by S.	W.	W. by N.	W.N.W.	N.W. by W.	N.W.	N.W. by N.	N.N.W.	N. by W.		
Lat. 0° to 1° S.	19	%	.	.	5	.	5	.	.	27	5	.	11	5	5	.	.	5	.	.	.	.	.	.	.	.	.	.	.	5	11	11	.	.	5
Long. 30° to 33° W.	2'8	Mean force	.	.	3'0	.	4'0	.	.	3'4	2'0	.	5'0	5'0	1'0	.	.	1'0	.	.	.	.	.	.	.	.	.	.	.	2'0	2'8	1'5	.	.	.
Lat. 1° to 2° S.	17	%	.	.	.	.	.	.	6	12	.	6	.	12	11	6	.	6	.	6	.	.	.	.	.	.	6	.	.	23	.	.	6	.	
Long. 30° to 33° W.	3'2	Mean force	.	.	.	.	.	.	4'0	4'0	.	5'0	.	5'0	1'5	3'0	.	3'5	.	2'0	.	.	.	.	.	1'0	.	.	3'5	.	.	1'0	.	.	
Lat. 2° to 3° S.	22	%	5	.	.	.	.	9	.	5	14	14	.	5	23	9	4	.	.	.	.	.	.	.	.	.	.	.	.	4	.	.	4	4	
Long. 30° to 33° W.	3'2	Mean force	5'0	.	.	.	.	5'5	.	4'0	3'0	3'2	.	3'5	3'4	4'0	4'0	.	.	.	.	.	.	.	.	.	1'0	.	.	3'5	.	.	1'5	.	
Lat. 3° to 4° S.	36	%	.	.	.	6	.	.	.	5	11	8	3	16	19	14	3	6	.	3	.	.	.	.	.	.	.	.	.	.	.	.	3	2	
Long. 30° to 33° W.	3'6	Mean force	.	.	.	3'5	.	.	.	3'5	3'6	3'5	4'0	3'8	3'1	4'4	5'0	4'3	.	3'0	.	.	.	.	.	.	.	.	.	.	.	.	2'5	.	
Lat. 4° to 5° S.	30	%	.	.	.	.	.	.	.	7	13	10	20	23	17	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	3	.
Long. 30° to 33° W.	4'0	Mean force	.	.	.	.	.	.	.	4'3	4'3	4'7	4'0	4'2	3'8	4'3	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Lat. 5° to 6° S.	36	%	.	.	.	.	.	.	3	.	.	11	6	17	33	19	3	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	8	.
Long. 30° to 33° W.	4'2	Mean force	.	.	.	.	.	.	5'0	.	.	4'1	5'0	3'8	4'5	4'6	3'5	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	2'0	.	.
Lat. 6° to 7° S.	33	%	.	.	.	.	.	.	3	.	.	10	8	26	18	21	8	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	3	3
Long. 30° to 33° W.	4'4	Mean force	.	.	.	.	.	.	5'0	.	.	4'4	4'2	4'5	4'4	4'9	5'0	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	1'0	.	.
Lat. 7° to 8° S.	37	%	.	.	.	.	.	.	3	.	.	5	8	33	24	16	8	3	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Long. 30° to 33° W.	4'6	Mean force	.	.	.	.	.	.	6'0	.	.	6'0	4'7	4'6	4'2	4'8	4'3	3'0	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Lat. 8° to 9° S.	34	%	.	.	.	.	.	.	3	3	12	15	29	15	17	.	3	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	3	.
Long. 30° to 33° W.	4'4	Mean force	.	.	.	.	.	.	2'0	3'5	5'0	5'2	4'9	4'3	4'0	.	1'0	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	3'0	.
Lat. 9° to 10° S.	37	%	.	.	.	.	.	3	.	.	5	8	25	19	24	8	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	8	.
Long. 30° to 33° W.	4'1	Mean force	.	.	.	.	.	3'0	.	.	3'5	6'0	4'7	4'6	4'1	3'2	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	1'5	.	.

- APRIL.

EASTERN PART.—LONGITUDE 30° to 33° W.

[illegible]

SQUARE 303 -

WESTERN PART.—LONGITUDE 33° to 35° W.

[illegible]

SQUARE 303 -

WESTERN PART.—LONGITUDE 33° to 35° W.

[illegible]

- JULY.

EASTERN PART.—LONGITUDE 30° to 33° W.

Position.		Total Observations and Mean Force.	% of Observations and Mean Force on each Point.	N.	N. by E.	N.N.E.	N.E. by N.	N.E.	N.E. by E.	E.N.E.	E. by N.	E.	E. by S.	E.S.E.	S.E. by E.	S.E.	S.E. by S.	S.S.E.	S. by E.	S.	S. by W.	S.S.W.	S.W. by S.	S.W.	S.W. by W.	W.S.W.	W. by S.	W.	W. by N.	W.N.W.	N.W. by W.	N.W.	N.W. by N.	N.N.W.	N. by W.	Variables.	
				Lat. 0° to 1° S.	36	%	3	3	.	17	11	28	30	8
Long. 30° to 33° W.	4'7	Mean force	.	.	.	.	.	.	5°0	5°0	.	4°6	5°3	5°0	4°4	4°7	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Lat. 1° to 2° S.	35	%	.	.	.	.	.	.	9	3	.	8	9	25	40	6	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Long. 30° to 33° W.	4'5	Mean force	.	.	.	.	.	.	5°3	4°0	.	4°5	4°7	4°4	4°4	5°5	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Lat. 2° to 3° S.	47	%	.	.	.	.	.	.	4	2	.	4	11	11	41	21	4	2	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Long. 30° to 33° W.	4'4	Mean force	.	.	.	.	.	.	4°8	4°0	.	4°5	4°7	4°0	4°2	4°8	4°8	4°0	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Lat. 3° to 4° S.	62	%	.	.	.	.	.	.	2	.	.	5	8	3	11	32	26	8	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	5
Long. 30° to 33° W.	4'5	Mean force	.	.	.	.	.	.	3°0	.	.	4°7	4°5	5°0	4°1	4°6	4°7	4°1	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	5°0
Lat. 4° to 5° S.	74	%	.	.	.	.	.	.	.	.	.	10	6	23	18	15	16	4	4	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	4
Long. 30° to 33° W.	4'7	Mean force	.	.	.	.	.	.	.	.	.	3°9	4°8	4°3	4°9	5°0	5°4	5°8	4°5	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	4°3
Lat. 5° to 6° S.	53	%	.	.	.	.	.	.	.	.	.	7	2	26	23	17	10	10	3	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	2
Long. 30° to 33° W.	4'7	Mean force	.	.	.	.	.	.	.	.	.	3°0	5°5	4°8	4°2	4°9	5°8	5°0	6°3	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	2°0
Lat. 6° to 7° S.	58	%	.	.	.	.	.	.	.	3	.	2	12	29	26	14	12	2	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Long. 30° to 33° W.	4'4	Mean force	.	.	.	.	.	.	1°8	.	.	4°0	4°1	4°6	4°4	4°9	4°9	3°0	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Lat. 7° to 8° S.	66	%	.	.	.	.	.	.	.	.	.	2	9	27	27	17	9	1	4	2	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	2
Long. 30° to 33° W.	4'7	Mean force	.	.	.	.	.	.	.	.	.	5°0	4°7	5°0	4°8	4°8	4°6	2°0	3°3	0.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	5°0
Lat. 8° to 9° S.	63	%	.	.	.	.	.	.	.	.	.	3	22	38	8	21	2	5	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	1
Long. 30° to 33° W.	4'9	Mean force	.	.	.	.	.	.	.	.	.	5°5	5°0	5°1	4°8	4°6	5°0	3°0	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	5°0
Lat. 9° to 10° S.	60	%	.	.	.	.	.	.	.	.	.	3	24	25	15	13	5	5	3	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	7
Long. 30° to 33° W.	4'6	Mean force	.	.	.	.	.	.	.	.	.	6°0	4°6	4°6	4°4	4°6	3°0	6°3	5°0	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	3°5

- AUGUST.

EASTERN PART.—LONGITUDE 30° to 33° W.

Lat. 0° to 1° S.	37	%	.	.	.	.	.	.	.	5	6	3	19	43	19	.	5	.	.	.	.	.	.	.	.
Long. 30° to 33° W.	4'1	Mean force	.	.	.	.	.	.	.	4'5	4'5	4'5	4'6	3'8	3'9	.	5'0	.	.	.	.	.	.	.	.
Lat. 1° to 2° S.	39	%	.	.	.	.	.	.	.	5	.	10	10	21	31	15	.	8	.	.	.	.	.	.	.
Long. 30° to 33° W.	4'6	Mean force	.	.	.	.	.	.	.	6'0	.	4'8	4'1	4'2	4'6	4'5	.	6'0	.	.	.	.	.	.	.
Lat. 2° to 3° S.	37	%	.	.	.	.	.	.	.	3	13	16	22	27	11	3	5	.	.	.	.	.	.	.	.
Long. 30° to 33° W.	4'5	Mean force	.	.	.	.	.	.	.	4'0	5'3	4'3	4'5	4'6	4'6	4'0	3'0	.	.	.	.	.	.	.	.
Lat. 3° to 4° S.	45	%	.	.	.	.	.	.	2	.	2	13	7	22	33	9	5	7	.	.	.	.	.	.	.
Long. 30° to 33° W.	4'5	Mean force	.	.	.	.	.	.	5'0	.	4'0	4'3	5'0	4'4	4'7	4'3	4'0	4'7	.	.	.	.	.	.	.
Lat. 4° to 5° S.	62	%	.	.	.	.	.	.	2	1	3	10	15	19	30	18	2	.	.	.	.	.	.	.	.
Long. 30° to 33° W.	4'5	Mean force	.	.	.	.	.	.	2'0	5'0	4'0	4'4	4'8	4'6	4'7	4'4	4'0	.	.	.	.	.	.	.	.
Lat. 5° to 6° S.	45	%	.	.	.	.	.	.	.	5	13	13	20	31	7	5	4	2	.	.	.	.	.	.	.
Long. 30° to 33° W.	4'9	Mean force	.	.	.	.	.	.	.	4'8	5'2	4'3	4'0	4'7	6'3	5'0	4'0	6'0	.	.	.	.	.	.	.
Lat. 6° to 7° S.	33	%	.	.	.	.	.	.	2	4	5	2	2	33	21	27	2	2	.	.	.	.	.	.	.
Long. 30° to 33° W.	4'5	Mean force	.	.	.	.	.	.	.	4'5	4'5	5'3	4'0	5'0	4'7	4'1	4'4	2'5	5'0	.	.	.	.	.	.
Lat. 7° to 8° S.	65	%	.	.	.	.	.	.	2	5	2	3	20	40	23	4	.	.	.	.	.	.	.	.	1
Long. 30° to 33° W.	4'7	Mean force	.	.	.	.	.	.	.	5'0	5'0	4'5	5'0	4'8	4'7	4'6	5'3	.	.	.	.	.	.	.	4'0
Lat. 8° to 9° S.	51	%	.	.	.	.	.	.	.	2	8	8	27	35	16	4	.	.	.	.	.	.	.	.	.
Long. 30° to 33° W.	4'7	Mean force	.	.	.	.	.	.	.	4'0	4'3	5'0	4'6	4'7	4'5	5'5	.	.	.	.	.	.	.	.	.
Lat. 9° to 10° S.	46	%	.	.	.	.	.	.	2	8	9	4	30	35	5	5	. 2	.	.	.	.	.	.	.	.
Long. 30° to 33° W.	4'6	Mean force	.	.	.	.	.	.	.	5'0	4'3	5'3	4'0	4'9	4'5	4'5	6'5	.	0'5	.	.	.	.	.	.

SQUARE 303 -

WESTERN PART.—LONGITUDE 33° to 35° W.

Position.	Total Observations and Mean Force.	% of Observations and Mean Force on each Point.	N.	N. by E.	N.N.E.	N.E. by N.	N.E.	N.E. by E.	E.N.E.	E. by N.	E.	E. by S.	E.S.E.	S.E. by E.	S.E.	S.E. by S.	S.S.E.	S. by E.	S.	S. by W.	S.S.W.	S.W. by S.	S.W.	S.W. by W.	W.S.W.	W. by S.	W.	W. by N.	W.N.W.	N.W. by W.	N.W.	N.W. by N.	N.N.W.	N. by W.	Variables.	Calm.	
Lat. 0° to 1° S.	45	%	13	7	27	47	.	6
Long. 33° to 35° W.	4'4	Mean force	.	.	.	.	.	.	.	.	3'5	4'0	4'3	4'6	.	5'0	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Lat. 1° to 2° S.	45	%	.	.	.	.	.	.	.	.	13	27	33	20	7	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Long. 33° to 35° W.	5'0	Mean force	.	.	.	.	.	.	.	.	5'0	5'0	4'9	5'0	6'0	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Lat. 2° to 3° S.	43	%	.	.	.	.	.	.	.	.	.	39	46	15	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Long. 33° to 35° W.	4'7	Mean force	.	.	.	.	.	.	.	.	.	4'5	4'9	4'3	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Lat. 3° to 4° S.	35	%	.	.	.	.	.	.	4	.	12	32	24	24	4	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Long. 33° to 35° W.	4'3	Mean force	.	.	.	.	.	5'0	.	3'8	4'6	4'7	3'9	3'0	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Lat. 4° to 5° S.	31	%	.	.	.	.	.	.	7	.	3	20	45	19	6	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Long. 33° to 35° W.	4'8	Mean force	.	.	.	.	5'0	.	5'0	4'6	4'9	5'0	4'5	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Lat. 5° to 6° S.	49	%	.	.	.	.	.	2	6	20	21	37	10	4	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Long. 33° to 35° W.	4'4	Mean force	.	.	.	.	2'0	3'8	4'5	4'5	4'3	4'8	4'5	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Lat. 6° to 7° S.	53	%	.	.	.	.	.	12	19	17	43	7	2	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Long. 33° to 35° W.	4'3	Mean force	.	.	.	.	.	3'7	4'4	3'9	4'5	4'5	4'0	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Lat. 7° to 8° S.	69	%	.	.	.	1	3	3	9	9	20	19	31	4	1	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Long. 33° to 35° W.	4'2	Mean force	.	.	.	5'0	5'0	3'0	4'6	3'4	4'1	4'2	4'4	3'8	4'0	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Lat. 8° to 9° S.	67	%	4	12	13	20	21	23	3	3	1
Long. 33° to 35° W.	4'1	Mean force	.	.	.	.	3'7	3'7	4'0	4'4	4'5	4'0	3'5	3'5	3'0	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Lat. 9° to 10° S.	53	%	7	19	7	33	8	19	5	2
Long. 33° to 35° W.	4'6	Mean force	.	.	.	.	4'3	4'6	4'4	4'7	4'2	4'5	4'8	5'0	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.

SQUARE 303 -

WESTERN PART.—LONGITUDE 33° to 35° W.

Lat. 0° to 1° S.	7	%	.	.	.	.	.	.	.	14	43	14	.	29	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Long. 33° to 35° W.	4'1	Mean force	.	.	.	.	.	.	.	4'0	4'3	4'0	.	4'0	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Lat. 1° to 2° S.	3	%	.	.	.	.	.	.	.	67	33	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Long. 33° to 35° W.	4'7	Mean force	.	.	.	.	.	.	.	4'5	5'0	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Lat. 2° to 3° S.	46	%	.	.	.	.	6	.	19	50	25	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Long. 33° to 35° W.	4'1	Mean force	.	.	.	.	3'0	.	3'8	4'3	4'3	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Lat. 3° to 4° S.	44	%	.	.	.	.	18	23	18	18	9	9	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Long. 33° to 35° W.	3'5	Mean force	.	.	.	.	3'0	3'0	4'0	3'8	4'0	4'0	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Lat. 4° to 5° S.	46	%	.	.	.	.	6	19	12	19	38	.	6	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Long. 33° to 35° W.	3'8	Mean force	.	.	.	.	2'0	3'3	3'5	4'5	4'0	.	4'0	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Lat. 5° to 6° S.	48	%	.	.	.	.	5	17	28	11	22	17	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Long. 33° to 35° W.	3'9	Mean force	.	.	.	.	2'0	4'0	3'4	4'3	4'4	4'3	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Lat. 6° to 7° S.	40	%	.	.	.	.	2	10	.	30	23	18	10	7	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Long. 33° to 35° W.	3'7	Mean force	.	.	.	.	1'0	3'0	.	3'9	3'5	3'5	4'6	4'3	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Lat. 7° to 8° S.	32	%	.	.	.	3	.	3	19	25	22	22	3	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Long. 33° to 35° W.	3'9	Mean force	.	.	.	4'0	.	3'0	4'0	4'1	4'2	3'9	3'0	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Lat. 8° to 9° S.	32	%	.	.	.	19	.	6	19	6	16	22	6	3	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Long. 33° to 35° W.	4'0	Mean force	.	.	.	3'7	.	4'0	4'3	3'3	4'3	4'6	3'0	4'5	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Lat. 9° to 10° S.	39	%	.	.	.	8	3	23	3	2	10	8	20	18	5	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Long. 33° to 35° W.	4'2	Mean force	.	.	.	3'3	2'0	4'0	4'0	4'0	4'3	4'7	4'8	4'4	4'3	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.

- NOVEMBER.

EASTERN PART.—LONGITUDE 30° to 33° W.

Position.	Total Observations and Mean Force.	% of Observations and Mean Force on each Point.	N.	N. by E.	N.N.E.	N.E. by N.	N.E.	N.E. by E.	E.N.E.	E. by N.	E.	E. by S.	E.S.E.	S.E. by E.	S.E.	S.E. by S.	S.S.E.	S. by E.	S.	S. by W.	S.S.W.	S.W. by S.	S.W.	S.W. by W.	W.S.W.	W. by S.	W.	W. by N.	W.N.W.	N.W. by W.	N.W.	N.W. by N.	N.N.W.	N. by W.	Variables.	Calm.	
Lat. 0° to 1° S.	56	%	2	3	11	39	27	18
Long. 30° to 33° W.	4'3	Mean force	.	.	.	.	.	.	.	.	3'5	4'5	4'2	4'1	4'2	4'8	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Lat. 1° to 2° S.	74	%	.	.	.	.	.	.	.	.	4	10	8	35	27	15	1	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Long. 30° to 33° W.	4'5	Mean force	.	.	.	.	.	.	.	.	3'8	4'1	4'8	4'7	4'5	4'1	3'0	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Lat. 2° to 3° S.	82	%	.	.	.	.	.	.	.	.	4	8	15	38	22	12	1	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Long. 30° to 33° W.	4'6	Mean force	.	.	.	.	.	.	.	.	4'0	4'2	4'4	4'8	4'8	4'4	3'0	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Lat. 3° to 4° S.	74	%	.	.	.	.	.	.	.	.	4	11	11	46	13	15	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Long. 30° to 33° W.	4'7	Mean force	.	.	.	.	.	.	.	.	3'7	4'6	4'4	4'9	4'8	4'8	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Lat. 4° to 5° S.	87	%	.	.	.	.	.	.	2	3	2	9	22	37	15	10	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Long. 30° to 33° W.	4'7	Mean force	.	.	.	.	.	.	3'5	5'0	3'8	4'7	4'8	4'8	4'6	4'6	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Lat. 5° to 6° S.	87	%	.	.	.	.	.	.	4	1	18	22	40	8	5	1	1	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Long. 30° to 33° W.	4'7	Mean force	.	.	.	.	.	.	4'5	4'0	4'6	4'9	4'7	5'0	4'5	5'0	4'5	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Lat. 6° to 7° S.	75	%	.	.	.	.	.	.	4	8	6	11	21	33	12	5	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Long. 30° to 33° W.	4'8	Mean force	.	.	.	.	.	.	3'5	4'7	4'9	5'3	5'1	4'9	4'5	4'8	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Lat. 7° to 8° S.	84	%	.	.	.	.	.	.	4	6	9	16	26	29	10	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Long. 30° to 33° W.	4'8	Mean force	.	.	.	.	.	.	3'3	4'5	4'8	4'8	5'0	4'9	4'6	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Lat. 8° to 9° S.	63	%	.	.	.	.	2	6	8	8	25	25	21	5	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Long. 30° to 33° W.	4'5	Mean force	.	.	.	.	.	5'0	3'4	4'0	3'7	4'8	4'8	4'6	4'2	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Lat. 9° to 10° S.	64	%	.	.	.	.	.	5	11	14	26	25	11	8	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Long. 30° to 33° W.	4'7	Mean force	4'0	4'9	4'7	4'8	4'8	4'4	4'8		

- DECEMBER.

EASTERN PART.—LONGITUDE 30° to 33° W.

Lat. 0° to 1° S.	40	%	.
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LIST OF PUBLICATIONS, &c.

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