THE CLIMATE AND WEATHER

OF THE

FALKLAND ISLANDS.

This account is taken mainly from
"The Climate and Weather of the Falkland Islands and South Georgia,"

BY

C. E. P. BROOKS,

London Meteorological Office, Geophysical Memoir No. 15, 1919.

PRINTED BY
WATERLOW AND SONS LIMITED, LONDON WALL, LONDON.
1923.

THE CLIMATE AND WEATHER

OF THE

FALKLAND ISLANDS.

This account is taken mainly from
"The Climate and Weather of the Falkland Islands and South Georgia,"

BY

C. E. P. BROOKS,

London Meteorological Office, Geophysical Memoir No. 15, 1919.

PRINTED BY
WATERLOW AND SONS LIMITED, LONDON WALL, LONDON.
1923.

THE CLIMATE AND WEATHER

OF THE

FALKLAND ISLANDS.[1]

---

[1] *This account is taken mainly from "The Climate and Weather of the Falkland Islands and South Georgia," by C. E. P. Brooks, London Meteorological Office, Geophysical Memoir No.* 15, 1919.

1.—GENERAL.

The Falkland Islands lie in the South Atlantic Ocean, 250 miles east of the south-eastern extremity of South America; they consist of a group of more than one hundred islands and islets, with a total area of 6,500 square miles, but of these only two, East and West Falkland, are of any considerable size. Both islands are mountainous, rising to 2,300 feet, with a very irregular and indented coast-line. The surface is largely covered by peat-bogs and numerous small lakes. There is a comparatively rich flora of grasses and shrubs, including the well-known tussock grass—isolated dense tufts of reed-like grass growing to a height of six to ten feet. The native fauna is small, consisting mainly of land and sea birds.

The first observations taken in the Falkland Islands were by Sir James Ross in April to August, 1842 ("Voyage to the Southern Seas," vol. ii., pp. 428-437). Observations have been taken at Cape Pembroke Lighthouse (lat. 51° 41′ S., long. 57° 42′ W.) since 1850, with occasional intervals, but in the absence of adequate supervision and instruction the records were of little value until the visit of the *Scotia*, in January, 1903, gave the necessary stimulus. Since 1903 the observations, taken under the supervision of Mr. John Pearce, the principal lighthouse keeper, have been excellent. In 1903, also, Mr. Mossman, the meteorologist to the *Scotia* expedition, set up a sunshine recorder at Stanley, in charge of Sir William Wilson, the Governor of the islands; thanks to the supervision of the latter and later to that of Sir William Allardyce and Sir W. Douglas Young, this has continued in working order until the present day, with very few gaps.

A good station was set up in 1874 by Mr. F. E. Cobb at Stanley Harbour (51° 41′ S., 57° 51′ W.), and continued until December, 1883; rainfall observations were also taken for a few months in 1891 and recommenced under the supervision of Sir William Wilson in 1904. The following report is based on these observations at Stanley as well as on those at Cape Pembroke.

2.—DISTRIBUTION OF ATMOSPHERIC PRESSURE.

The average level of the barometer in the Falkland Islands is rather low, being 29·6 inches at sea-level (corrected for gravity). On the whole the readings are highest in late winter and spring (July to October) and lowest in summer (November to April). The comparative low readings are due to the position of the islands in the southern temperate storm belt. Pressure rises to the northward and decreases rapidly to the southward; at Buenos Aires it is about 30·0 inches, and on the polar circle only 29·2 inches. The isobars run east and west, so that there is no great variation of pressure

TABLE I.—MONTHLY MEAN PRESSURE IN INCHES (32° F. LAT. 45°, M.S.L., MEAN OF 24 HOURS) AT CAPE PEMBROKE.

	Jan.	Feb.	March.	April.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.	Year.
1895	29·56	29·67	29·32	29·51	29·57	29·55	29·49	29·62	29·81	29·56	29·59	29·47	29·56
1896	29·45	29·74	29·55	29·62	29·55	29·68	29·64	29·58	29·76	29·58	29·26	29·43	29·57
1897	29·53	29·54	29·68	29·34	29·58	29·69	29·67	29·65	29·85	29·62	29·61	29·45	29·60
1898	29·49	29·47	29·46	29·58	29·72	29·79	29·59	29·80	29·75	29·76	29·53	29·56	29·63
1899	29·51	29·59	29·51	29·46	29·40	29·80	29·41	29·72	29·73	29·52	29·47	29·46	29·54
1900	29·35	—	29·51	29·66	29·72	29·76	29·55	29·85	29·72	29·63	29·31	29·52	(29·59)
1901	29·69	29·47	29·55	29·60	29·50	29·61	29·42	29·74	29·70	29·57	29·65	29·54	29·59
1902	29·50	29·40	29·61	29·55	29·44	29·65	29·45	29·42	29·62	29·52	29·46	29·48	29·51
1903	29·54	29·44	29·32	29·64	29·64	29·52	29·80	29·77	29·75	29·87	29·80	29·75	29·65
1904	29·58	29·63	29·50	29·74	29·69	29·67	29·66	29·63	29·42	29·61	29·59	29·69	29·62
1905	29·55	29·43	29·62	29·61	29·68	29·26	29·63	29·42	29·61	29·56	29·65	29·58	29·55
1906	29·63	29·63	29·46	29·57	29·45	29·76	29·66	29·69	29·78	29·65	29·51	29·41	29·60
1907	29·49	29·62	29·60	29·64	29·43	29·51	29·75	30·03	29·69	29·70	29·38	29·37	29·60
1908	29·56	29·64	29·63	29·48	29·65	29·61	—	29·75	29·66	29·51	29·43	29·50	(29·59)
1909	29·53	29·55	29·57	29·52	29·55	29·49	29·61	29·54	29·81	29·78	29·61	29·43	29·58
1910	29·30	29·60	29·83	29·63	29·50	29·46	29·66	29·41	29·62	29·79	29·55	29·68	29·59
1911	29·41	29·65	29·64	29·59	29·76	29·67	29·72	29·41	29·83	29·69	29·43	29·63	29·62
1912	29·58	29·32	29·50	29·58	29·50	29·57	29·67	29·79	29·65	29·70	29·32	29·45	29·55
1913	29·58	29·51	29·51	29·46	29·42	29·65	29·52	29·65	29·65	29·62	29·57	29·66	29·57
1914	29·54	29·53	29·77	29·73	29·60	29·47	29·68	29·70	29·73	29·65	29·39	29·66	29·62
1915	29·54	29·55	29·72	29·33	29·29	29·56	29·45	29·35	29·73	29·77	29·53	29·51	29·53
1916	29·48	29·69	29·51	29·60	29·32	29·52	29·62	29·79	29·43	29·73	29·43	29·46	29·55
Mean	29·52	29·56	29·56	29·57	29·54	29·60	29·60	29·65	29·70	29·65	29·50	29·53	29·58

with longitude. Most of the storms which move from west to east across the Southern Ocean pass with their centres to the southward of the Falkland Islands, and give rise to the strong westerly winds which dominate the climate of the region.

The means of pressure, month by month, are set out in Table 1, which covers the period 1895 to 1916. The figures from 1895 to 1901 are not so reliable as those for later dates. The variation is considerable, ranging from 29·26 inches in November, 1896, and June, 1905, to 30·03 inches in August, 1907, at sea level; the variability is greater in winter than in summer.

Although during unsettled or stormy weather the barometer may be rising or falling at any hour of the day, in the rare periods of quiet, settled weather, a regular diurnal variation of pressure appears. The same result is obtained by combining all the observations which are taken at the same hour of the day in each month or season into a single mean, by which process we eliminate the irregularities caused by all ups and downs of the barometer, which are independent of the time of day.

The diurnal variation of pressure is very well marked in the tropical regions, where there are always two maxima each day at about 9 h. and 21 h., and two minima, at about 3 h. and 15 h., the range being as much as 0·1 inch. As we pass to higher latitudes the range becomes very much less, and in place of two equally developed maxima we find only one, with indications of a second. At Cape Pembroke the means of the observations taken at four-hourly intervals are as follows. (The figures show deviations from the daily mean) :—

	0h.	4h.	8h.	12h.	16h.	20h.
	inch.	inch.	inch.	inch.	inch.	inch.
October to March ...	+ ·011	·000	+ ·002	— ·010	— ·010	+ ·008
April to September ...	+ ·006	— ·005	+ ·002	— ·002	— ·005	+ ·005

When these observations are plotted on squared paper and smooth curves drawn through them, it is found that the chief maximum occurs at 22 h., the chief minimum at 14 h. in summer and 15 h. in winter; there is a secondary maximum at 8 h. and minimum at 4 h. best developed in winter. The range is only ·028 inch in summer and ·014 inch in winter.

3.—TEMPERATURE.

The results of the observations of temperature at Cape Pembroke and at Stanley are set out in Tables 2 and 3. In Table 2 the mean temperatures for each month are given; the figures for Stanley are based on the means of the daily maximum and minimum readings corrected to the mean of 24 hours; those at Cape Pembroke are based on observations taken six times daily. Table 3 gives the mean and extreme values over the whole period. The mean annual temperature is about 43° F. at both places; January is the warmest month (49° F.) and July the coolest (37° F.), giving an annual range of 12° F. The corresponding temperatures at Kew (London) are :—Annual mean, 50° F., July 63° F., January 39° F.; so that in the Falkland Islands the winters are slightly colder and the summers much cooler than in London, which is about as far to the north of the equator as Stanley is to the south. The January temperature at Stanley is even lower than the annual mean at London. The relatively low Falkland temperatures are largely due to the oceanic circulation. The general eastward drift of the Southern Ocean is interrupted by the long peninsula of

TABLE 2.—MEAN MONTHLY TEMPERATURES IN DEGREES FAHRENHEIT (MEAN OF 24 HOURS AT STANLEY (1874—1883) AND CAPE PEMBROKE (1903—1916).

	Jan.	Feb.	March.	April.	May	June	July.	Aug.	Sept.	Oct.	Nov.	Dec.	Year.
1874	—	—	—	—	—	—	—	—	—	—	—	48·5	—
1875	48·6	48·2	49·1	43·6	41·4	38·9	37·4	38·6	41·6	41·8	45·8	45·4	43·4
1876	46·8	47·1	45·7	45·0	39·7	37·4	37·4	37·1	40·6	39·6	42·8	47·2	42·2
1877	52·2	48·8	50·3	43·0	40·9	38·3	35·6	37·4	37·4	40·7	44·5	46·2	43·0
1878	51·6	50·0	43·9	—	—	—	—	—	—	—	—	—	—
1879	—	—	—	—	—	—	—	—	—	—	—	—	—
1880	—	50·2	46·3	43·2	39·2	37·3	37·0	35·0	40·8	42·8	45·8	46·2	—
1881	48·0	47·8	45·6	44·1	39·6	36·7	36·7	37·0	38·2	43·2	45·6	47·2	42·5
1882	48·6	49·6	45·3	40·3	37·7	36·1	36·4	37·4	39·2	42·6	46·2	48·2	42·3
1883	48·0	47·8	44·8	42·0	40·3	36·9	37·5	38·0	39·8	43·2	44·4	44·4	42·3
1903	47·6	47·6	45·5	43·6	41·2	38·9	37·0	37·3	39·1	41·2	45·1	46·8	42·6
1904	49·5	49·9	47·7	44·2	38·3	39·5	33·8	37·8	39·4	40·0	44·4	45·3	42·5
1905	48·6	46·5	47·7	43·5	38·9	37·5	35·0	36·9	39·2	41·8	45·4	46·0	42·3
1906	50·7	48·7	46·4	42·6	37·1	37·1	35·6	37·9	38·9	41·7	44·4	46·1	42·3
1907	50·1	50·0	48·6	44·3	40·8	—	—	—	—	—	—	—	—
1908	—	—	—	—	—	—	—	38·1	40·7	40·9	43·2	44·5	—
1909	49·3	47·4	47·3	44·9	41·8	39·5	37·8	38·4	39·4	42·2	43·5	45·7	43·1
1910	48·7	48·2	47·4	43·0	41·0	37·2	37·0	38·5	40·0	41·7	45·2	47·8	43·0
1911	48·6	48·6	47·1	43·4	41·9	39·5	38·8	37·4	39·5	40·9	42·2	46·6	42·9
1912	50·2	48·7	46·8	44·2	39·4	37·1	36·4	35·8	39·2	42·7	43·2	45·6	42·4
1913	49·0	49·3	46·0	44·1	40·5	36·6	35·9	37·5	40·6	42·8	44·6	46·8	42·8
1914	48·5	50·3	49·4	45·5	42·5	37·3	36·0	37·5	37·5	41·3	41·5	46·8	42·8
1915	48·2	49·8	48·6	41·4	39·4	36·1	37·6	36·0	39·4	42·3	45·1	47·1	42·6
1916	48·4	49·7	46·1	43·9	41·1	36·3	36·0	38·8	39·2	42·2	44·3	47·3	42·8
Mean, 20 years	49·1	48·8	46·9	43·5	40·1	37·6	36·6	37·4	39·5	41·8	44·4	46·5	42·7

TABLE 3.—MEAN AND EXTREME VALUES OF TEMPERATURE IN DEGREES FAHRENHEIT.

	Jan.	Feb.	Mar.	April.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.	Year.
CAPE PEMBROKE.	10 years 1905—1915.												
Mean Temperature	49·3	48·7	47·5	43·7	40·3	37·6	36·7	37·4	39·4	41·9	43·9	46·2	42·7
Mean Daily Max....	54·9	54·5	52·9	48·4	44·1	41·0	40·1	41·0	44·2	47·1	49·8	51·8	47·5
Mean Daily Min....	44·6	44·1	42·6	38·8	35·8	33·1	32·7	33·3	35·1	37·2	39·0	41·7	38·2
Mean Monthly Max.	67	65	62	57	50	47	46	47	51	56	61	63	69
Mean Monthly Min.	38	39	36	30	29	25	24	27	29	32	32	35	23
Highest Max. ...	72	75	66	59	56	49	53	50	54	59	67	70	75
Lowest Min. ...	34	33	32	27	28	21	19	21	27	29	28	32	19
STANLEY.	7—8 years, 1874—1883.												
Mean Temperature	49·2	48·6	46·3	43·0	39·9	37·3	36·9	37·2	39·6	42·0	45·0	46·6	42·6
Mean Daily Max....	56·3	55·6	52·4	48·1	43·7	40·8	40·5	41·4	44·6	48·3	52·0	53·7	48·1
Mean Daily Min. ...	43·0	42·7	40·7	37·8	35·2	33·1	32·7	32·8	34·9	36·3	39·0	40·6	37·4
Mean Monthly Max.	67	65	63	56	49	46	46	48	53	59	63	65	70
Mean Monthly Min.	35	35	31	30	27	24	23	24	27	28	32	33	18
Highest Max. ...	76	69	67	59	51	48	48	52	59	62	68	69	76
Lowest Min. ...	33	33	27	24	24	12	18	12	23	26	30	31	12

Patagonia and deflected southward to Cape Horn, where it sweeps up considerable numbers of icebergs from the Antarctic. After rounding Cape Horn it divides into two branches, of which the westerly, or Falkland current, travels due northward west of the Falkland Islands, while the easterly, the main part of the Cape Horn current, travels in an east-north-east direction towards South Georgia. Owing to the cooling of the air due to these two ice-laden currents, a rapid fall of temperature is experienced from west to east, and Cape Pembroke is 13 degrees colder than the east coast of Patagonia, in the same latitude.

The average of the highest temperatures recorded each day is known as the mean daily maximum; at Cape Pembroke this varies from 55° F. in January to 40° in July. The mean daily minimum, or average of the lowest temperatures recorded each night, is 45° F. in January and 33° in July: the daily range is thus 10° in January and 7° in July. At Stanley, which is further removed from the open sea, the temperature is higher during the day and lower at night than at Cape Pembroke, the daily range being 13° F. in January and 8° F. in July.

The mean monthly maximum and minimum are the averages of the highest and lowest temperatures respectively in each month, that is, the figure of 67° F. in January (Table 3) is the average of the highest maxima of each of ten Januarys.

The corresponding mean annual maxima and minima give the averages of the highest and lowest temperatures recorded each year: these are 69° and 23° at Cape Pembroke and 70° and 18° at Stanley, that is, the temperature will reach these limits at least once in one year out of every two. The absolute extremes recorded in ten years at Cape Pembroke were 75° and 19°: in eight years at Stanley 76° and 12°.

Owing to the irregular day to day changes, which are very great in the Falkland Islands, the highest temperature of the twenty-four hours does not always occur in the early afternoon, but may fall at any time of the day or night. On the average, however, which may be taken to represent the conditions during quiet weather, 13 h. is the hottest time of the day, while the coolest is just before sunrise. The difference at Cape Pembroke is 5·7° F. in January but only 2·5° in July. The variation from day to day is also slightly greater in summer than in winter, the average difference from noon of one day to noon of the next being 4·0° F. in January and 2·7° F. in July.

In Tables 4 and 5 we have the average number of days per month with the highest and lowest temperatures between different limits at Cape Pembroke.

4.—RELATIVE HUMIDITY AND CLOUDINESS.

The air at Cape Pembroke is damp throughout the year, the average relative humidity (24 hour mean) ranging from 80 per cent. of saturation in January to 88 per cent. in June and July. The average monthly figures are set out in Table 6, which also gives the average figures at 4 h., when the air is most humid, and noon, when it is driest.

The number of overcast days is considerable, and the average cloudiness is seven-tenths of the sky covered. March and September have the clearest skies, but the differences throughout the year are unimportant.

5.—BRIGHT SUNSHINE.

The tabulation of the sunshine records from Stanley for the ten years 1906 to 1915 provides a good basis for the discussion of the amount of sunshine which is experienced. The results of this tabulation are set out

in Table 7, which gives the average proportion of bright sunshine experienced per day in each month, together with the number of days with different amounts of sunshine. It should be noted that the exposure of the sunshine recorder is not quite free to the westward, so that no sunshine is recorded after 5.30 p.m., even though the sky is clear. The amount which is lost from this cause may be estimated as 0·5 hour from November to January inclusive, 0·3 hour in February, and 0·2 hour in October. In other months it is negligible. The number of days in the year without any sunshine averages 59, 36 of which occur during the four months May to August.

The sunniest part of the day falls between the hours of 10.30 and 13.30, when bright sunshine is experienced for nearly half the time in summer—slightly more than half in February. June, on the other hand, has bright sunshine for less than a third of the time, even at mid-day. January and February are the sunniest, with $5\frac{1}{2}$ hours per day, June the dullest, with a little over $1\frac{1}{2}$ hours.

TABLE 4.—AVERAGE NUMBER OF DAYS PER MONTH WITH THE HIGHEST TEMPERATURE BETWEEN DIFFERENT LIMITS AT CAPE PEMBROKE.

	30°–35°F.	35°–40°F.	40°–45°F.	45°–50°F.	50°–55°F.	55°–60°F.	60°–65°F.	65°–70°F.
January ...	—	—	1	5	12	7	5	1
February ...	—	—	—	4	12	9	3	—
March ...	—	—	2	7	14	6	1	1
April ...	—	1	5	13	9	2	—	—
May	1	4	12	13	1	—	—	—
June	3	8	17	2	—	—	—	—
July	3	11	15	1	1	—	—	—
August ...	1	10	17	3	—	—	—	—
September ...	—	3	17	8	2	—	—	—
October ...	—	1	11	10	7	2	—	—
November ...	—	—	4	12	10	3	1	—
December ...	—	—	—	11	12	5	2	1
Year	8	38	101	89	80	34	12	3

TABLE 5.—AVERAGE NUMBER OF DAYS PER MONTH WITH THE LOWEST TEMPERATURE BETWEEN DIFFERENT LIMITS AT CAPE PEMBROKE.

	20°–25°F.	25°–30°F.	30°–35°F.	35°–40°F.	40°–45°F.	45°–50°F.	50°–55°F.	55°–60°F.
January ...	—	—	1	4	12	10	3	1
February ...	—	—	—	5	12	9	2	—
March ...	—	—	1	8	14	7	1	—
April ...	—	2	5	10	10	3	—	—
May	—	4	11	11	5	—	—	—
June	1	7	12	9	1	—	—	—
July ...	2	6	14	9	—	—	—	—
August ...	1	4	17	9	—	—	—	—
September ...	—	3	13	13	1	—	—	—
October ...	—	1	8	17	5	—	—	—
November ...	—	1	5	13	9	2	—	—
December ...	—	—	—	10	15	5	1	—
Year	4	28	87	118	84	36	7	1

TABLE 6.—RELATIVE HUMIDITY AND CLOUDINESS AT CAPE PEMBROKE.

	Jan.	Feb.	March.	April.	May.	June.	July.	August.	Sept.	Oct.	Nov.	Dec.	Year.
%	%	%	%	%	%	%	%	%	%	%	%	%	%
Mean (24 hours) ...	80	81	83	83	85	88	88	87	85	82	81	81	84
4 h.	86	86	87	87	87	89	89	88	88	86	86	86	87
12 h.	75	76	77	79	83	86	86	84	81	78	76	78	80
Cloudiness (24 hours)*	7·1	7·0	6·9	7·0	7·2	7·3	7·3	7·0	6·9	7·0	7·0	7·3	7·1

* In tenths of sky covered.

TABLE 7.—AVERAGE PROPORTION OF BRIGHT SUNSHINE PER DAY AND NUMBER OF DAYS WITH DIFFERENT AMOUNTS OF SUNSHINE AT STANLEY.

	Jan.	Feb.	March.	April.	May.	June.	July.	August.	Sept.	Oct.	Nov.	Dec.	Year.
	hrs.	hrs.	hrs.	hrs.	hrs.	hrs.	hrs.	hrs.	hrs.	hrs.	hrs.	hrs.	hrs.
Average per day ...	5·36	5·35	4·49	3·44	2·30	1·62	1·94	2·62	3·83	4·48	5·19	5·01	3·80
No. of days with													
0 hrs....	2	1	3	4	9	10	10	7	5	3	2	3	59
0–3 ,, ...	8	7	9	12	10	13	13	13	9	9	7	8	118
3–6 ,, ...	8	7	8	8	8	6	6	8	7	8	9	8	91
6–9 ,, ...	8	8	7	5	4	1	2	3	7	7	8	7	67
More than 9 ,, ...	5	5	4	1	0	0	0	0	2	4	4	5	30

6.—PRECIPITATION (RAIN, SNOW AND HAIL) AND WEATHER.

The only station for which there is a long series of rainfall records is Stanley (Table 8), for which the records now cover twenty-five years, spread over the period 1874 to 1920. At this station the average fall is 26·43 inches per year, December and January being the wettest months, with 2·88 and 2·70 inches respectively (May coming third with 2·63 inches), while September, with 1·43 inch, and October, with 1·49 inch, are the driest months. The average at Kew Observatory is 23·80 inches, the monthly means varying from 2·70 to 1·45, so that the amount of rainfall at Stanley is not greatly different from that of London. The highest monthly total recorded was 6·64 inches in January, 1911; there has been no month entirely without rain.

Stanley, however, like London, is on the comparatively sheltered east coast; on the exposed west coast and the high ground of the interior the rainfall must be much heavier.

The average number of raindays (0·01 inch or more) at Stanley is 226, varying from 16 in September and October to 21 in May, June and July. At Kew Observatory the corresponding number is only 167 in the year.

There are thus more wet days in the Falklands than in London. At Cape Pembroke there is no raingauge, but the occurrence of rain, snow and hail is noted; the average annual total is 253 days. The heaviest fall recorded in 24 hours at Stanley was 1·69 inch.

At Cape Pembroke *snow* has fallen in every month except January and February, but it is rare in December and March, and the annual total averages only 54 days. *Hail* occurs two or three times in each month. *Thunderstorms* are experienced occasionally in summer, but the average number is only four in each year. The occurrences of these phenomena are shown in Table 9. The term "precipitation" includes rain, snow and hail.

Fog is of great importance at Cape Pembroke, as it occurs on an average on 54 days, distributed through the year. In winter the occurrence appears to be independent of the time of day, but in summer it occurs chiefly at night. The average number of occurrences of fog lasting for at least fifteen minutes, grouped in four-hourly intervals, is as follows:—

Hours.	0–4	4–8	8–12	12–16	16–20	20–24	Sum.
Summer (Nov.—April)	12	12	8	7	10	11	60
Winter (May—Oct.) ...	9	11	10	9	11	10	60

7.—WINDS.

The prevailing wind direction at Cape Pembroke is from north-west; winds from south-west, west and north are also frequent. The wind is most westerly in summer and winter, and inclines to north-west in spring and autumn. Easterly and south-easterly winds are rare, especially in spring and autumn; calms are even more uncommon. The percentage frequency of winds from different directions is shown in Table 10. When a large number of days are averaged, some diurnal variation appears in the wind direction in summer, but this is almost obliterated in winter. The wind is most northerly at 4 h., backing during the day and reaching its most westerly direction at 16 h., after which it veers again during the night. Even in summer, however, the average range is only 15 degrees, or a little more than

TABLE 8.—MONTHLY TOTALS OF RAINFALL AT STANLEY, IN INCHES.

	Jan.	Feb.	March.	April.	May.	June.	July.	August.	Sept.	Oct.	Nov.	Dec.	Year.
1874	2·17	1·40	2·43	2·13	0·73	1·01	1·42	2·77	1·56	1·21	1·03	2·46	20·32
1875	3·27	3·32	1·76	2·40	1·45	1·43	1·18	0·91	0·84	1·07	1·21	2·92	21·79
1876	3·27	2·00	2·12	1·07	1·64	1·10	2·76	1·70	1·58	1·28	0·91	0·99	20·42
1877	1·60	1·23	1·20	2·54	1·98	1·78	1·57	0·90	1·02	1·71	1·27	1·97	18·77
1878	1·15	1·21	1·78	—	—	—	—	—	—	—	—	—	—
1879	—	—	—	—	—	—	—	—	—	—	—	—	—
1880	—	1·96	4·46	3·09	2·09	1·87	1·48	2·66	1·84	1·07	2·50	4·00	—
1881	4·00	2·10	2·99	2·52	2·37	2·91	3·09	2·01	1·87	1·95	1·77	3·45	31·03
1882	2·79	2·38	2·76	3·03	5·19	2·24	0·84	2·00	1·70	2·15	2·75	2·58	30·11
1883	3·31	2·99	5·34	3·30	1·69	1·73	2·63	1·17	1·43	0·55	2·07	3·18	29·39
1891	2·06	3·38	1·65	0·88	1·18	—	—	—	—	—	—	—	—
1904	—	—	—	—	—	—	—	2·01	2·44	2·84	1·61	2·82	—
1905	3·57	4·57	1·90	2·11	2·81	2·53	2·58	2·09	0·35	1·29	1·07	2·77	27·61
1906	2·09	1·87	2·67	2·15	2·21	2·90	2·09	1·49	0·91	2·33	1·61	3·34	25·66
1907	1·05	1·68	0·73	1·24	2·07	1·77	1·85	1·23	1·37	1·55	2·60	3·60	20·74
1908	2·43	2·19	2·49	2·01	1·81	1·31	2·55	1·06	1·73	2·83	3·07	1·75	25·23
1909	2·33	2·14	2·29	3·54	2·47	2·03	1·20	3·12	1·11	2·08	2·08	4·81	29·23
1910	3·77	2·42	0·82	2·57	4·39	1·73	1·98	3·01	1·12	0·31	2·40	3·23	27·78
1911	6·64	1·67	2·35	3·31	3·96	2·43	4·29	1·08	1·35	1·57	2·83	2·48	36·96
1912	1·99	4·28	2·69	2·14	1·52	1·29	0·91	1·65	0·99	1·33	2·62	3·48	21·89
1913	1·75	1·75	4·51	2·68	2·33	2·41	1·43	2·23	0·59	1·28	2·52	2·60	26·08
1914	3·14	1·61	1·42	2·10	1·43	2·43	—	—	—	—	—	—	—
1915	2·90	1·60	1·26	3·25	4·21	1·87	2·48	3·53	1·60	0·84	2·27	2·69	27·90
1916	1·71	0·95	3·29	1·80	5·69	3·60	1·71	1·44	1·18	1·62	2·71	2·99	28·12
1917	3·87	1·39	2·10	1·52	1·39	3·25	2·69	1·22	2·50	1·45	0·98	3·22	24·68
1918	2·16	2·47	3·02	2·65	2·58	2·97	2·96	2·60	2·06	1·78	1·75	0·57	27·57
1919	1·58	2·79	1·09	3·64	5·69	2·91	2·72	2·81	2·38	1·04	1·87	2·37	30·95
1920	2·96	3·02	3·15	1·27	2·76	3·32	2·03	0·87	1·38	1·03	2·77	4·92	29·18
Mean ...	2·70	2·25	2·39	2·36	2·63	2·18	2·08	2·03	1·43	1·49	2·01	2·88	26·43

TABLE 9.—NUMBER OF DAYS OF PRECIPITATION AT STANLEY AND NUMBER OF DAYS WITH CERTAIN PHENOMENA AT CAPE PEMBROKE.

	Jan.	Feb.	March.	April.	May.	June.	July.	August.	Sept.	Oct.	Nov.	Dec.	Year.
STANLEY.													
Precipitation (0·01 in. or more) ...	18	17	19	20	21	21	21	20	16	16	17	20	226
CAPE PEMBROKE.													
Precipitation (any amount) ...	22	21	19	21	23	24	23	22	17	18	22	21	253
Snow	0	0	1	4	7	10	11	8	5	3	4	1	54
Hail	2	2	2	4	3	2	2	2	2	3	4	3	31
Thunderstorms	0·9	0·6	0·5	0·3	0·0	0·0	0·0	0·0	0·0	0·1	0·4	1·0	3·8
Fog....	6	3	5	4	3	5	6	4	5	5	3	5	54

TABLE 10.—PERCENTAGE FREQUENCY OF WINDS UNDER DIFFERENT DIRECTIONS AT CAPE PEMBROKE.

Calm	2	1	1	1	1	1	1	1	1	0	1	2	1
N.	13	15	19	15	16	14	15	18	21	18	16	16	16
N.E.	9	6	6	6	6	7	7	7	5	6	5	9	7
E.	3	2	1	1	2	2	2	2	1	1	2	4	2
S.E.	3	2	1	2	2	6	3	2	1	2	1	5	3
S.	6	6	6	6	8	11	8	6	3	7	5	6	7
S.W.	24	21	20	18	14	14	14	15	15	18	24	24	18
W.	20	25	20	25	24	21	27	24	23	20	23	15	22
N.W.	20	22	26	26	27	24	23	25	30	28	23	19	24

TABLE 11.—PERCENTAGE OF TIME DURING WHICH GALES AND STRONG WINDS (BEAUFORT FORCE 4–7) BLEW AND MEAN WIND FORCE (BEAUFORT SCALE) AT CAPE PEMBROKE.

Gales per cent.	1·9	3·3	3·5	4·1	3·0	2·6	3·1	1·7	1·8	2·8	2·6	1·8	2·7
Strong Winds per cent.	67	70	71	70	69	66	64	65	70	69	74	65	68
Mean Force Beaufort Scale ...	4·4	4·6	4·6	4·6	4·4	4·3	4·3	4·3	4·5	4·5	4·6	4·2	4·4
Mean speed. Miles per hour ...	17	19	19	19	17	17	17	17	18	18	19	16	17

one point of the compass, which would not be noticeable among the much greater changes of direction due to the passage of depressions, and could only be made out on the quietest days.

The force of the wind is considerable, even at Cape Pembroke, which is on the leeward side of the island. There is no anemometer at this station, and Table 11 is based on the observers' estimates according to the Beaufort scale. According to these, gales prevail for 2·7 per cent. of the time, or for 237 hours during the year. The stormiest months are April and March. Strong winds (Beaufort scale force 4-7) prevail for 68 per cent., or more than two-thirds of the time.

The average force of the wind (Beaufort scale) at Cape Pembroke is between four and five throughout the year, reaching a maximum from February to April and in November. This is equivalent to an average velocity of 17 to 18 miles per hour at 30 feet above the ground.

8.—THE WEATHER CONDITIONS WITH WINDS FROM DIFFERENT DIRECTIONS.

Table 12 gives the average values of pressure, temperature, relative humidity and cloudiness at Cape Pembroke for January and July at noon under different wind directions. Pressure is highest with winds from north to north-east and south to south-west in January, and with winds from north-east to south-east in July; it is lowest with winds from north-west to west, which are those chiefly associated with the passage of storms. The winds from the equatorial side, especially from north-west and north, are the warmest, while the southerly or polar winds are coldest. In January the difference between north-west and south winds is as much as 8° F.

TABLE 12.—AVERAGE VALUES OF VARIOUS ELEMENTS AT NOON UNDER DIFFERENT WIND DIRECTIONS AT CAPE PEMBROKE, 1905—1915.

	N.	N.E.	E.	S.E.	S.	S.W.	W.	N.W.
				Pressure in inches at Station Level :				
January ...	29·45	29·49	29·41	29·43	29·49	29·46	29·39	29·38
July	29·57	29·75	29·68	29·77	29·63	29·55	29·52	29·46
				Temperature—Degrees Fahrenheit :				
January ...	53·4	52·0	50·3	48·6	47·3	49·9	52·5	55·2
July ...	39·8	38·2	38·5	36·3	34·9	35·5	36·2	39·3
				Relative Humidity per cent :				
January ...	78	80	83	80	78	75	71	66
July ...	88	90	92	91	82	83	86	87
				Cloudiness, tenths :				
January ...	7·6	7·5	8·2	7·4	7·3	6·8	6·4	7·0
July ...	8·1	9·0	8·9	8·6	8·1	7·6	6·8	6·7

In general, westerly winds are driest and easterly winds contain the most moisture; this unexpected result is due to the position of Cape Pembroke to the east of the Falkland Islands, so that the westerly winds blow off the land, and have already deposited much of their moisture on the hills of the interior, while the easterly winds blow directly off the sea. On the west side of the islands these conditions would be reversed. The same remark applies to cloudiness, which is also least with westerly and greatest with easterly winds.

TABLE 13.—METEOROLOGICAL OBSERVATIONS AT CAPE PEMBROKE DURING THE PASSAGE OF THE DEPRESSION OF MARCH 5TH TO 8TH, 1909, AT CAPE PEMBROKE.

Date.	Hour.	Pressure. 32°F. Lat. 45° M.S.L.	Dry Bulb.	Wet Bulb.	Wind.		Cloud.		Weather.	Remarks.
					Direction.	Force.	Amount.	Type.		
1909	hours.	ins.	° F.	° F.		Scale 0–12	0–10			
March 5...	4	29·49	42	40	W.	4	8	Cu-nb.	Cloudy, passing showers.	
	8	29·56	44	41	W.N.W.	5	7	Cu-nb.	Fair, passing showers.	
	12	29·52	49	43	W.	5–6	7	Cu-nb.	Fair, squally, passing showers.	
	16	29·51	49	44	W.	5	7	Cu-nb.	Fair, squally, passing showers.	
	20	29·45	46	43	N.W.	5	7	Cu-nb.	Fair, passing showers.	
	24	29·23	49	47	N.	5–6	8	St.	Cloudy, squally.	
March 6...	4	28·99	48	47	N.	6	10	St.	Overcast, squally, passing showers.	
	8	28·63	50	49	N.	5	10	St.	Overcast, heavy rain.	
	12	28·45	46	45	N.W.	7–8	9	Nb.	Cloudy, very squally, heavy passing showers.	At 21h. 15, wind N.W.3, weather overcast, light rain.
	16	28·38	46	44	W.N.W.	7–8	8	Cu-nb.	Fair, very squally, heavy passing showers.	At 21h.30, wind S.W.5, weather overcast, light rain.
	20	28·26	45	44	W.N.W.	5–7	8	Cu-nb.	Cloudy, very squally, passing showers.	At 21h.35, barometer 28·24 ins.
	24	28·30	47	45	S.S.W.	7–9	9	—	Cloudy, very squally, passing showers.	
March 7...	4	28·44	too stormy.		S.S.W.	8–10	10	—	Overcast, rain, very squally.	
	8	28·74	43	41	S.S.W.	9–10	8	Cu-nb.	Fair, very squally, heavy passing showers.	Very heavy sea, S.S.W.
	12	28·92	42	40	S.S.W.	9–10	7	Cu-nb.	Fair, very squally, passing showers.	
	16	29·06	42	39	S.S.W.	9–10	7	Cu-nb.	Fair, very squally, heavy passing showers.	
	20	29·18	40	38	S.S.W.	9–10	7	Cu-nb.	Fair, very squally, passing showers.	
	24	29·22	40	39	S.S.W.	8	9	Cu-nb.	Cloudy, very squally, passing showers.	
March 8...	4	29·34	38	37	S.S.W.	8–9	8	Cu-nb.	Cloudy, very squally, heavy hail showers.	
	8	29·42	40	38	S.S.W.	8–9	9	Cu-nb.	Very cloudy and squally, heavy hail showers.	Heavy sea running S.S.W.
	12	29·47	41	38	S.S.W.	6–7	9	Cu-nb.	Cloudy, squally, passing showers.	
	16	29·49	41	38	S.S.W.	6	9	Cu-nb.	Cloudy, squally, passing showers.	
	20	29·54	41	38	S.	5	9	Cu-nb.	Cloudy.	
	24	29·58	41	38	S.S.W.	5	9	—	Cloudy.	

9.—STORMS.

During ten years there were twenty storms in which the barometer fell below 28·5 inches at sea-level at Cape Pembroke. These were distributed through the year as follows: five in winter, two in spring, five in summer, and eight in autumn. There were five occasions on which the barometer fell below 28·35 inches.

A typical storm was that of March 5th to 8th, 1909; the observations taken during this storm are shown in Table 13. The wind, which was westerly on the 5th, veered to north by the morning of the 6th, backing again to W.N.W. and increasing to a gale in the evening. At 21 h. 15 m. it dropped to force three and backed to S.W. force five at 21 h. 30 m. The lowest pressure, 28·24 inches, was reached five minutes later, after which the wind increased rapidly to a gale (force 8-10) from S.S.W., with heavy squalls, which continued until the morning of the 8th.

This sequence of wind changes indicates that the centre of the storm passed not far to the southward of Cape Pembroke. This is the usual track of the summer and autumn storms; those of winter lie still further to the southward. One storm, that of February 10th to 13th, 1905, though not among the most severe, was remarkable because the centre passed right over Cape Pembroke. The wind dropped rapidly from force six from N.N.E. at 8 h. on the 11th to force one from N. at noon, while the rain ceased and a fair interval appeared.

By 16 h. the wind had begun to blow from the opposite quarter—south-west—with gale force, and the rain recommenced. In both this and the preceding case there was a relatively calm centre to the storm.

The storms are sometimes rendered more dangerous by the occurrence of mist or even thick fog with winds of gale force. This is especially the case in winter. Winter storms are also dangerous owing to the limitation of visibility by heavy snow.

Owing to the easterly motion of the southern temperate storms, they must pass the southern extremity of South America about two to three days before reaching the Falkland Islands, and it should be possible to obtain telegraphic warning of their approach from the Argentine Meteorological Service. This method of forecasting would probably be practicable in summer, when the storm tracks are most definite, but would be more doubtful in winter.