

To John W. Slater Esq
with kind regards
M. Spence

THE CLIMATE OF ORKNEY

BY

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THE CLIMATE OF ORKNEY.

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The Orkney Islands lie between 58° 45' and 59° 22' N lat. and 2° 22' and 3° 25' W long. The range is very limited, and the climate within these limits is so much modified by the currents and moisture-laden winds of the Atlantic as to be unrecognisable by its latitude. As a whole, the climate does not differ greatly from that of the rest of Scotland. It avoids extremes, for it is neither so wet as the west of Scotland, nor so dry as the east; neither so cold as the inland districts in winter, nor so mild as in summer. Its one outstanding characteristic is wind. No other region in Great Britain can compare with it for the violence and frequency of its winds -

"There the fierce storm and maddening surge
Howl loud and long."

Although the climate of Orkney is free from the extremes of continental climates, its vagaries defy the systematic classifications of the Meteorologist. We divide the year into seasons, but winter often runs into spring and autumn into winter. In April - as in the present year, 1908 - we may have Arctic weather, really the Christmas snowstorm of the year, and at Christmas the mild weather of Biarritz. No May passes, and June very seldom, without a considerable sprinkling of snow and hail. After autumn has gathered her sheaves there invariably comes a fortnight or three weeks of the finest of weather towards the end of November, known in Orkney as the "Peerie Summer." We have no well-defined wet and dry seasons. This year, owing to the excessive wetness of April and May, when we generally expect dry weather, the farmers were busy sowing the latter half of the oat crop, and the usual bere one, during the third and fourth weeks of May. The occurrence is said to be unprecedented.

EARLY REFERENCES TO THE SUBJECT.

Whatever reference there is to climatic conditions in the many history books of the county, there is nothing but vague and unreliable generalisations which are elusive when closely examined. The Rev. J. Wallace, Minister of Kirkwall Cathedral, says, in 1693: "Our winters are generally more subject to rain than to snow, nor does the frost and snow continue so long here as in other parts of Scotland, but the winds will in the mean time blow very boisterously." James Butler, Sheriff-Depute of Orkney, states that in 1648 the crops were so poor that there was great famine among the poor people. Mr. Mathew Mackaile, MS., Advocates' Library, Edinburgh, says: "In January 1665 the frost and snow continued for fourteen days, and the like thereof none then alive had seen there."

Sheriff, in his *Agricultural Report of Orkney Islands in 1814*, says -

"A peculiar dampness of the air which is almost perpetual prevails. The springs are late and the vegetation rather slow and backward, the prevailing winds during that season being from the north. This cold uncongenial weather sometimes continues till the month of June is considerably advanced."

Barry, in his *History of Orkney in 1805*, says -

"Many hundred years ago it was observed that the SW wind was more prevalent than any other in Great Britain. The same observation may with propriety be extended to Orkney. From the SE, too, the winds are very frequent, and sometimes even stormy. In the spring, summer, and harvest, while these winds prevail, the weather is sometimes dry and cold, sometimes damp, and not unfrequently thick, dark, foggy, and when this last kind of weather continues for any time it seldom fails to depress the animal spirits and generate colds, coughs, sore throats, and similar complaints. Some part of the month of June is here often not only colder than the preceding months, but almost as much so as any winter month. For about two weeks, and sometimes more, the wind blows from the north, strong and piercing, accompanied with snow and hail showers which clothe the fields with a dreary aspect by checking the progress of the young plant, and to a stranger would seem to threaten the islands with famine. The cause of this unnatural cold evidently is the dissolving of the immense fields of ice in the Northern Ocean and the consequent evaporation."

POSSIBLE OSCILLATIONS OF CLIMATE.

No one could reasonably expect any definite remarks about climatic conditions before the introduction of recording instruments, and the vagueness of what references we do find makes them scientifically of little value, though they are of general interest. The statement, however, of Mr. Mackaile is rather a strange one. It might have been passed over by treating it as a casual remark, but he seems to have had an intimate acquaintance with the local tides, from which we may infer that he also knew the climate. That two hundred and forty-three years ago no one should have remembered snow and frost of longer duration than a fortnight is strange.

Octogenarians of to-day never tire of reminding us that when they were boys the length and frequency of snowstorms greatly exceeded those of the present day. In 1895 we had a severe winter, when snow covered the ground for fifty days in January, February, and the first week of March, continuously for at least six weeks, and with drifts of five, six, and even seven feet. Snowstorms of such dimensions visit us but rarely, but our fathers say they were of common occurrence one hundred years ago. If this statement of Mackaile is reliable, our winter climate oscillates in long periods from mild to more severe. Statistics are too few at present to do more than suggest explanations. Two centuries and a half ago the winters were mild; a century ago they were somewhat more severe; now they appear to be main getting milder. Except for four days in February and four in April, the ground was not covered with snow last winter. In regard to fog and dampness, it is probable that the change in this respect is small. Surrounded as the islands are by seas, which at every radical change of temperature are liable to produce fog, and swept almost daily

by the heavily laden moisture-bearing winds of the Atlantic, the wonder is the humidity is so moderate.

We give in Table I. humidity statistics for three characteristic stations, a northern, an eastern, and a western - Deerness, Aberdeen, and Rothesay.

TABLE I.
MEAN HUMIDITY, 1894-1903.

	Jan	Feb	Mar	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	YEAR
	%	%	%	%	%	%	%	%	%	%	%	%	%
Deerness	84.6	84.2	85.0	86.0	83.8	87.5	88.2	88.3	87.5	85.2	86.3	85.1	86.1
Aberdeen	81.7	79.3	80.8	79.9	77.8	78.1	77.7	79.2	82.2	83.4	83.2	82.9	80.1
Rothesay	87.0	85.8	84.4	82.0	77.0	80.9	84.4	85.8	87.4	88.4	88.8	88.5	85.0

These figures are the means of morning and evening observations, and are plotted in Fig. I. The curves show at a glance that Aberdeen is much drier than either Deerness or Rothesay, and that Rothesay is damper during the autumn and winter months, but much drier in summer. Dundee, with its smoke-laden atmosphere so productive of vapour, is the only east coast station as humid as Deerness. Several stations on the west coast, and most of those at high elevations, are damper, but Orkney is considerably above the mean for Scotland.

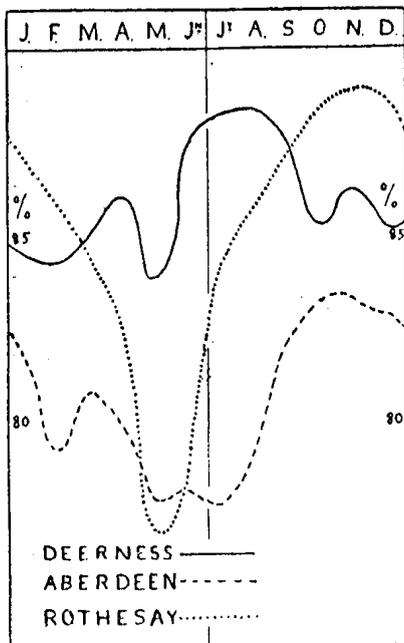


FIG. 1.—Mean Monthly Humidity.

We may note that Dr. Clouston, in a paper published in 1861 by the Board of Trade, stated that the humidity of Orkney averaged 84.1 per cent., which was below the mean for Scotland. It is difficult to reconcile this statement with the information afforded by more recent statistics.

THE WANT OF TREES.

" The circling hills all bare and wild,
Bare with the blight of thousand years."

Nothing in the Orkneys strikes the eye of the stranger so much as the bare, bleak, treeless stretch of undulating country intersected by sounds, firths, and rushing tideways, and relieved only, if relief there be, by the rounded hummocky hills. This description applies only in winter and early spring. Summer brings green fields, purple hills, blue seas, and a variety of cloud effect; so that these contrasts and high colourings make the whole group of islands present a charming scene, to which trees, if added, would seem

superfluous. Many surmises have been made as to the cause of this treeless scene. The salinity of the atmosphere, the comparative mild winters and biting springs, and the frequent gales, have each been credited. No doubt all three contribute more or less to produce this monotonous landscape; but when we consider that one day in every three on an average brings a gale of over thirty-seven miles an hour in velocity, and that even in summer gales of high velocity are experienced, the reason is clear. In June 1890 a gale of seventy-five miles per hour occurred, and in June 1907 one of sixty-three miles per hour, which withered the leaves and checked the growth of the young branches of existing trees. A plantation of trees grows well at Birscarth, in the West Mainland, where it is extremely well sheltered, and again in Kirkwall, where, in the early stages at least, there is good shelter. A farmer told me he had planted a thousand trees several years ago, and that, although most commenced to grow, not one now exists.

At one time trees did grow in Orkney in considerable abundance. Some of our peat bogs are filled with their remains, but generally these are of dwarfed specimens - the most numerous being black birch. The oscillations of climate were, no doubt, considerable long ago, for we find that at one period, and often two, in the history of the peat bogs, dwarf forests grew abundantly, when the air seemed to have been comparatively dry. At a later period we find these all killed out, and laid prone by a vigorous growth of *Sphagnum* - peat-producing moss - which flourishes during a period of excessive humidity. Remnants of these forest trees are still found growing in the sheltered crannies of Hoy, which is the most hilly island of the group, and contains the best sheltered valleys. These are mountain ash, poplar, hazel, black birch, willow, and honeysuckle; but they exist in very attenuated forms.

THE PRESENT-DAY FLORA.

Besides these, there are other plants on the verge of extinction that probably indicate a change of climate. Two ferns - *harl's-tongue* and *holly* - were at one time much more common than now. The most marked I have seen is *Carex paniculata*; it is extremely rare, but certainly native. I know of just one patch of bog containing several tussocks, but all the plants are now so weakly that the seeds hardly ever ripen. This, for a native plant which must at one time have been in fair numbers, is eloquent of change. Then *wood sorrel* is a plant that has probably struggled for existence since the valleys were clothed with brushwood. It is now found only in the beds of one or two streams, where it is sheltered from the "howling blasts of bleak Orcades." *St. John's Wort*, *Hypericum clodes*, grew in Berridale, Hoy, in 1805; it is now extinct. *Winter green* is now confined to a sheltered valley in the island of Rousay. A good many south country plants find their way to Orkney amongst agricultural seeds, but very few survive beyond a season, and probably not more than one or two have been acclimatised. On the other hand there is a marked difference when seeds are brought from the north. On the banks near the village of Pierowall, Westray, and on the roadside, there is a plant, *Archangelica officinalis*, which leas no doubt been brought with

fishing smacks from the Faroe Isles, where it is abundant. It is thriving splendidly, and producing strong healthy seed. It is not native in Britain. Our beautiful little *Primula scotia* more common in Lapland, Norway, and Sweden, seems to be spreading and growing vigorously. It produces seed twice yearly, and specimens growing in my garden seeded thrice last year. If these instances point in any direction, it is to the generalisation that plants from the south of Orkney have difficulty in maintaining life, while those from the north are readily acclimatised.

SOME CURRENT OPINIONS.

Before examining the statistics of the subject, we may be permitted, however futile some may consider the inquiry, to relate the current opinion of Orcadians who are octogenarians. If you were to ask them regarding the weather in their young days, almost without exception they would reply

"The winters were colder; snows and frost were more frequent and more severe; houses were often blocked with snow, so that people had sometimes to be dug out; lochs were so icebound that men; and even horses and carts, were known to cross them on ice ; the like is never heard of now; in summer it was so warm that most of the farmers carted their peats from 2 A.M. to 10 A.M. to avoid the excessive warmth of midday." Some of this, but not all, may be explained on the assumptions that young blood registers a higher temperature than old, and that periodic reflections on unusual phenomena tend to their exaggeration.

The year 1826 was unusually dry and the crops were miserable. Captain Oman, Stenness, a reliable observer stated, and others confirmed his statement, that from the sowing of bere, about the 12th of May till the crop was reaped, probably in the first week of August, there was not one shower. The crop was too poor in most cases to cut, and had to be pulled up by the roots.

THE AVAILABLE STATISTICS.

In 1827 the Rev. Charles Clouston, LL.D., Sandwick, commenced that series of weather observations which reflects such credit on his industry and scientific accuracy. For the long period of fifty-eight years, 1827 to 1885, he ungrudgingly gave of his time to this work. At first the only instruments were wet and dry bulb thermometers, but in 1839 a barometer, and in 1841 a rain-gauge, were added. The self-recording maximum and minimum thermometers were added to the equipment in 1856, and in 1862 an anemometer was fixed on the top of the manse, but this was replaced by a large "Robinson" in June 1869, which is still, after slight repairs, in very good working order. The sunshine recorder - a "Campbell Stokes" - was added to the station equipment in February 1880.

The present station at Deerness is recognised as a "Normal Climatological Station": the daily readings are printed in the Returns of the Meteorological Office, and the Monthly Means in this *Journal*.

In dealing with the pressure statistics, we give merely the means for

the twenty years 1861 to 1880, for Orkney and Brighton, just to show the relative difference between Orkney and the south of England -

TABLE II.

MEAN PRESSURE, 1861-1880.

	Jan.	Feb.	Mar.	April.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.	YEAR.
Dearness.	in.	in.	in	in.									
Brighton.	29.657	29.731	29.754	29.860	29.916	29.888	29.838	29.827	29.772	29.720	29.744	29.708	29.785
Difference.	29.981	29.973	29.896	29.947	29.982	29.998	29.979	29.973	29.959	29.910	29.924	29.977	29.958
	.324	.242	.142	.087	.066	.110	.141	.146	.187	.190	.180	.269	.173

Commenting on these figures, Dr. Buchan said: "This gives a difference in the mean January pressure of these two places of 0.324 inch, and, as the distance is 510 geographical miles, the mean barometric gradient is one-tenth of an inch for every 153 miles. This is one of the very steepest mean monthly barometric gradients that occurs at any season anywhere on the globe." So that, according to this great authority, the strongest and most numerous gales are found in Great Britain, and in Great Britain, Orkney, as we shall subsequently show, bears the unenviable distinction of "beating the record." Let us hope that when anemometers are erected in the Faroes and Iceland, across which a still more marked low-pressure region extends, we shall lose this embarrassing distinction and ungrudgingly hand it over to one of our northern neighbours.

TEMPERATURE OBSERVATIONS.

Temperature observations have been tabulated in Orkney for the long period of eighty-one years. The only other place in Scotland with a more extended continuous record is Edinburgh. We have already stated that the general belief is that the Orkney climate is getting colder in summer and milder in winter. Just yesterday we asked James Logie, M.D., Kirkwall, who was born in Orkney in 1820, and commenced the practice of his profession in 1845, if he considered the winters to be milder than in his young days. He replied: "Certainly. We neither have the heavy snowfalls nor the severe frosts we had in my younger days. Why, a few years after I settled in Kirkwall, I was called to the Bridge of Waith, and afterwards I rode up the Stenness Loch to Brodgar, and then up the Harray Loch to its head, in Sandwick - a distance of about four miles. Farmers were crossing the lochs frequently with horses and carts." Questioned further regarding summer, he replied: "It is my impression the summers were milder, but I am not so positive of this." Statistics seem to bear this out to a considerable extent, for after every probable error has been eliminated, the net result shows a marked deterioration of summer temperature, and at least considerable variation of the winter.

In Appendix, Table A, will be found the detailed statistics, with means for decennial periods, and below we give comparisons (1) between the means

for the first forty years and the last forty, and (2) between the means for the first available decade and the last. Thus we have -

MEAN TEMPERATURES.

	1827 to 1866	1867 to 1906	Difference.	1827 to 1836.	1897 to 1906.	Difference.
	°	°	°	°	°	°
January	38.5	39.0	+0.5	38.3	40.0	+1.7
February .	38.2	38.4	+0.2	38.6	37.2	- 1.4
March	40.0	39.4	- 0.6	40.8	39.3	- 1.5
April .	44.2	42.8	- 1.4	43.5	42.1	- 1.4
May .	47.7	46.6	- 1.1	48.5	46.1	- 2.4
June .	52.2	51.8	- 0.4	53.9	51.4	- 2.5
July .	54.9	54.8	- 0.1	55.8	54.6	- 1.2
August	54.8	54.3	- 0.5	55.0	53.8	- 1.2
September .	52.3	51.9	- 0.4	52.7	52.0	- 0.7
October	47.4	46.6	- 0.8	49.0	47.2	- 1.8
November .	42.4	42.2	- 0.2	43.1	43.3	+0.2
December .	41.0	39.1	- 1.9	41.1	40.3	- 0.8
Year	46.1	45.6	- 0.5	46.7	45.6	-1.1

Thus, comparing the two forty-year periods, the difference in the means is considerable only for the months of April, May, and December, but on comparing the first decennial period with the last, the results are quite unexpected, and the belief of the "man in the street" is this time confirmed.

That January should have increased in temperature and February diminished just as much, rather gives prominence to the fact that during the last twenty years most of our prolonged snowstorms have occurred in February. Thus in 1895 snow covered the ground for the month with the exception of one or two days. March and April are each nearly $1\frac{1}{2}^{\circ}$ in defect of the earlier period, but May and June - the two months when so much depends on the proper development of vegetable: growth - are $2^{\circ}.4$ and $2^{\circ}.5$ respectively colder. Then October is $1^{\circ}.8$ colder and December nearly 1° , showing that our winters now set in earlier.

The station, as we have said, remained in Dr. Clouston's charge from 1827 to 1885, when the equipment was removed to Swanbister, Orphir, and placed in charge of Mr. Fortescue - now M.D. of Kingussie - where it remained till 1890, when the present observer took charge. The instruments were removed to Deerness in March 1891, and have been there since. Swanbister lies ten miles SE of the Sandwick Manse, and Deerness lies thirteen and a half miles E of Swanbister, or twenty miles ESE of Sandwick Manse. The temperature of Deerness and Swanbister are nearly identical, but Sandwick is considerably milder. We have applied corrections for height and difference of temperature, and brought the readings of Swanbister, Sandwick, and Deerness to correspond, so as to be comparable. The plan we adopted was this - Applied Dr. Buchan's addition of 1° for 270 ft. in height, and brought the readings to the level of Sandwick (72 ft.), then by taking two quinquennial

periods for Sandwick and Kirkwall, viz 81-85, and then 93-97 for Kirkwall and Deerness, the mean difference for each month was found between Sandwick and Deerness. In fact, every probable element of error was eliminated, and the corrected means are thus carefully adjusted. Dr. Buchan once told me that the thermometer-screen at Sandwick was placed against the wall - no doubt the north wall of tile manse, - and beneath it was pavement. He considered this position a little unsatisfactory, otherwise observations were made with scrupulous care. But even if anyone were to cavil at the position of the screen, the fact remains that the climate of Orkney in Dr. Clouston's time shows more variation than subsequently. This may possibly be merely an oscillation of climatic conditions, but there is this difficulty, that the statistics of Culloden and Edinburgh, as examined by Dr. Buchan, show no serious decline of temperature. It may be measurable only on the northern boundary of Scotland. The change may lie in the temperature of the surrounding sea; it may be in the direction of the wind; it may be owing to colder and more persistent northern currents. We simply do not know. Our statistics are too few, but what we have are thoroughly reliable. No one who knew how deep was Dr. Clouston's interest in Meteorology and other scientific subjects, would doubt the accuracy of his observations.

The other two northern stations at Sumburgh Head and Stornoway should also show this change. Both have been recording stations for a much shorter time than this, but on making a rough calculation of temperature observations at Sumburgh Head the same tendency was apparent.

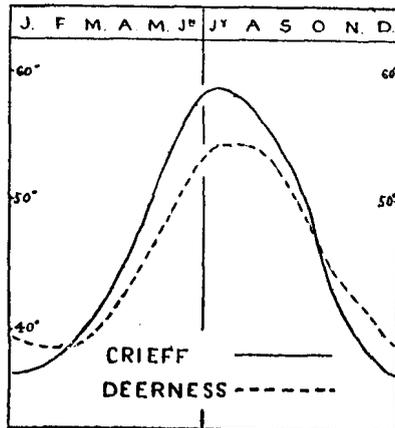
Let us now compare the mean temperature of a few stations -

MEAN TEMPERATURE, 1871 - 1905.

	Sumburgh Head.	Stornoway	Deerness.	Aberdeen.	Leith.
January .	39.0	38.8	39.0	37.7	39.0
February .	38.2	39.0	38.5	38.1	39.7
March .	38.6	39.7	39.3	40.1	41.4
April .	41.5	43.2	42.4	43.8	45.3
May .	45.2	47.3	46.4	48.3	50.1
June .	49.7	52.4	51.3	53.9	55.9
July .	52.8	54.8	54.2	57.2	59.1
August .	53.0	54.6	54.0	56.5	58.7
September .	50.6	51.5	51.5	53.0	54.9
October .	45.7	45.8	46.4	46.9	48.2
November .	42.3	42.3	42.4	41.9	43.1
December .	39.6	39.3	39.7	38.0	39.4
YEAR .	44.7	45.7	45.4	46.3	47.9

It will be noticed that the mean temperatures of Stornoway and Deerness are almost identical. The mild Atlantic currents in the winter, and the modifying influence of the surrounding ocean during the summer, affect both alike. Shetland has practically the same winter climate, but is rather more than 1° colder in summer. Aberdeen has colder winters and much milder summers.

Leith in January has the same mean temperature as Deerness, but in July is 5° warmer.



The difference between the annual march of temperature in the Orkneys and in Central Scotland is shown in Fig. 2, where the curves are for Deerness and Crieff.

The lowest mean for any month in Orkney during these eighty-one years is 31°.30, and the highest 61°.4, a monthly range of 30°.1; but individual days show a wider range. The lowest minimum reading of a properly protected thermometer during this time was 8°, and the highest maximum 76°, an extreme range of 68°. We have -

FIG. 2.-Mean Monthly Temperature.

ABSOLUTE EXTREMES FROM 1860-1908.

	Max.	Date.	Min.	Date.	Diff.
January	54.5	18th, 1889	7.8	18th, 1881	46.7
February	55.0	19th, 1891	11.9	20th, 1885	43.1
March .	57.2	- 1872	12.7	3rd, 1881	44.5
April .	62.8	- 1869	23.8	23rd, 1908	39.0
May	65.7	- 1864	29.0	3rd, 1877	36.7
Julie .	74.4	24th, 1876	33.0	8th, 1890	41.4
July	76.0	16th, 1876	35.8	7th, 1887	40.2
August.	76.0	- 1890	37.0	4th, 1886	39.0
September .	71.0	5th, 1898	32.3	- 1871	38.7
October	63.5	2nd, 1882	28.3	- 1869	35.2
November .	58.0	14th, 1881	25.2	- 1861	32.8
December .	55.8	- 1865	15.8	- 1860	40.0

Again, considering the highest monthly and annual means, and the lowest for eighty-one years, we have -

MEAN TEMPERATURES, 1827-1907.

	Highest Mean.	Year.	Lowest Mean.	Year.	Range.
January.	43.0	1898	32.2	1867	10.8
February.	43.1	1878	31.1	1838	12.0
March	45.1	1854	35.6	1888	9.5
April	47.6	1852	39.5	1859	8.1
May.	51.4	1833	43.1	1902	8.3
June	58.0	1834	48.7	1902	9.3
July.	61.4	1852	51.1	1886	10.3
August.	60.6	1852	50.3	1907	10.3
September	56.1	1865	48.3	1836	7.8
October.	54.2	1828	42.6	1885	11.6
November.	46.6	1857	39.0	1861	7.6
December.	46.4	1857	34.2	1886	12.2
YEAR.	48.35	1852	43.84	1892	4.51

1867 is the midway year between 1827, when observations commenced, and 1907. As with the absolute maxima, January and February give highest means on this side of the middle date, and all the others are prior to it. The lowest means, except those for February, April, September, and November, are on this side of the midway date, nearly the same as we found with the minima. The months showing the greatest difference in the means are December and February. The months of least difference are November and September (stated before). The mildest year, 1852, with $48^{\circ}.35$, and the coldest, 1892, with $43^{\circ}.84$, show a mean difference of $4^{\circ}.5$.

In working out the corrections to apply to Deerness to reduce its temperature to that of Sandwick, we were surprised to find the former much colder than the latter, the maximum differences occurring in June and July, which were respectively $1^{\circ}.1$ and $1^{\circ}.3$ colder in Deerness than in Sandwick, although the two stations are only twenty miles apart. The following is no doubt the explanation. In a recent trial case it was pretty clearly proved by Captain Bailie, Stromness, and by fishermen, that there is a constant current flowing northwards along the Sandwick coast, - the west coast. On the east coast at Deerness, on the other hand, the tide flows southwards for nine hours, and northwards, but much weaker, for three hours. This strong current from the north extends for at least forty miles to the east. These two currents, the one with its warm Atlantic waters, the other with its cold northern atmosphere, easily account for the difference.

As regards temperature, it remains to point out that a marked feature of the climate is the very moderate daily range. Thus we have -

MEAN DIFFERENCE BETWEEN DAY AND NIGHT.

	Deerness.	Crieff.	Aberdeen.
January	$7^{\circ}.2$	$10^{\circ}.5$	$9^{\circ}.0$
July	$9^{\circ}.3$	$17^{\circ}.1$	$13^{\circ}.0$

A comparatively small range is, of course, an invariable feature of an insular climate.

THE RAINFALL.

In Appendix, Table B, are given the full rainfall statistics with decennial means. We subjoin the following table of extremes :-

	Driest Month.	Year.	Wettest Month.	Year.
	in.		in.	
January.	1.37	1864	6.25	1843
February.	0.74	1858	5.88	1898
March .	0.34	1836	5.81	1882
April.	0.11	1852	4.33	1859
May.	0.38	1859	3.52	1841
Julie.	0.33	1871	3.85	1860
July.	1.07	1904	4.90	1891
August.	0.62	1852	6.74	1861
September.	0.60	1846	6.60	1869
October.	1.01	1856	7.82	1845
November.	1.37	1855	8.24	1866
December.	1.55	1905	7.75	1854

The wettest year was 1856, with 44.6 inches.

The driest year was 1898, with 27.4 inches.

The heaviest rainfall in twenty-four hours was on 136 July 1894, with 1.7 inches.

The mean annual rainfall (1.841-1907) was 36.68 inches.

SUNSHINE STATISTICS.

Sunshine observations were commenced in February 1880. The recorder is a Campbell-Stokes, and the present situation is perfect, there being no obstacle to interfere with the sun's rays at any period of the year. So far as we know, Swanbister and Sandwick had good exposures. The full statistics are given in Appendix, Table C, and the accompanying diagram, Fig. 3, affords a contrast between Aberdeen, one of the sunniest districts of Scotland, and Deerness. The sunniest month in the Orkneys is May, and it is also the driest. This relation is easily understood. June, which, owing to its length of day, should be the sunniest, is not, owing to the frequent fogs which prevent the sunshine reaching us. Then one would hardly expect cold April to be sunnier than July, but the heavier skies and rainfall and fogs of the latter cause it to be so. The sunniest month on record

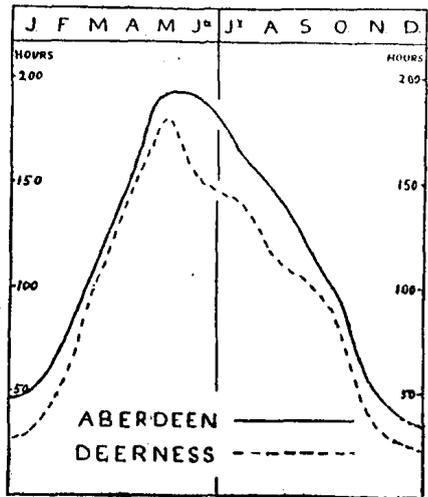


FIG. 3.—Mean Amount of Sunshine.

was May 1882, with 258 hours, and the dullest was December 1895, with 6 hours. The sunniest year was 1897, with 1352 hours, and the dullest 1896, with 971 hours; both are strangely found together, which is often Nature's way of paying compensation.

Below is given a comparison of sunniest and dullest months and years from 1880 - 1907 :-

		Sunniest		Dullest	Difference
		Hours		Hours	Hours
January.	1881, '83, '90	44	1885	9	35
February.	1895	88	1903	33.6	54.4
March.	1904	186	1885	54	132
April.	1906	200.9	1905	112.1	87.9
May.	1882	258.0	1906	131.8	126.2
June.	1888	229	1896	92	137
July.	1897	208	1891	88	120
August.	1898, 1897	170	1882	71	99
September.	1906	174.8	1896	73	101.8
October.	1891	112	1884, 1892	48	64
November.	1893	63	1888	8	55
December.	1891	39	1895	6	33
YEAR.	1897	1352	YEAR. 1896	971	381

THE GALES OF THE ORKNEYS.

The Orkneys surpass any other district in Great Britain, probably in the world, in the number of gales. The stormiest month is January, followed at short intervals by December and November. The mean monthly number of gales for the seventeen years 1890- - 1906 is as follows :-

Jan.	Feb.	Mar.	April.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.	YEAR
16.0	11.7	11.2	7.4	4.7	2.2	1.9	2.1	4.0	9.6	12.3	14.3	97.4

We do not have the honour, if honour there be, of having experienced the strongest gale ever reported in Great Britain, but we take second place. A gale was reported from Fleetwood in 1894 with a maximum velocity of 107 miles an hour, and exceeding 100 miles per hour for four hours. Our strongest gale occurred on 17th November 1893, and reached the high velocity of 96 miles per hour, but when taken for half an hour it reached 100. We are now reckoning with the old Robinson factor 3, and all velocities stated in this paper are calculated with that factor.

We have no title to discuss anemometer exposure, yet the annual velocities at different stations seem so inconsistent that some explanation is called for. Valencia, in the south-west of Ireland, is chosen, as it has all exposure like that of Orkney; its annual velocities are higher than those of any other station, Deerness excepted. No doubt the uninterrupted winds of Orkney come sweeping over the Atlantic and North Sea with no obstacles ahead of them to ease their fury.

Now take Aberdeen with its anemometer on King's College, no doubt to give it free space above the sea of house-tops. Here the wind strikes against walls and other irregularities, curves and eddies, so that the true velocity can hardly be obtained; but there is little doubt that the wind at Aberdeen is much less than in Orkney, and that its velocity as represented in the accompanying diagram, which is based on official returns, requires adjustment (Fig. 4). That the curves for Orkney and Valencia should be very far from similar is what we might expect, for most of the cyclones that cross near the Orkneys do not spread their sails so far south as Valencia. The direction of cyclones across Great Britain is guided very much by the position of anti-cyclones on Western Europe. When an anticyclone is situated over the Baltic, the tendency of cyclones is to cross the

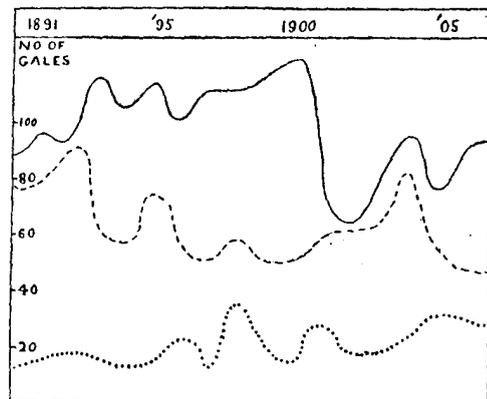


FIG. 4.—Number of gales each year.

Deerness —————
 Valencia - - - - -
 Aberdeen.....

cross the

south of England; when the anti-cyclone lies over France and the English Channel, the cyclones are driven northwards; with an anti-cyclone over Norway and another over Spain, the cyclones cross north between the two. Thus across Scotland, or north of it, during the year nearly twice as many cyclones cross as over south of England; to be more accurate, the proportion is twelve to seven.

How do all these winds affect the inhabitants? Strangers say the voice is louder, to make oneself heard above the warring elements, and that the rising intonation at the end of the sentence is a last effort to outdo the thunderous furies. This is more marked still in the small islands, where it is impossible to get away from the reverberating sound of ocean's roar. It is also said that the ever-recurring blast has made the footsteps heavier and the countenance more stolid and sombre. A gale every third day would have some such effect.

The following Table gives a list of gales with velocities of over eighty miles an hour experienced in Orkney since an anemometer was erected :-

GALES EXPERIENCED IN ORKNEY DURING THE PERIOD 1869-1908, IN WHICH THE WIND VELOCITY WAS 80 MILES PER HOUR AND UPWARDS.

Date and Hour of Maximum Velocity.	Direction of Wind.	Maximum Velocity.
1869 February 27 4am	NW by W	
1877 November 16 3am	W	83 " "
1882 January 6 5pm	W	82 " "
1884 January 20 9am	W by S	88 " "
1885 February 21 Midnight	S by E	82 " "
1893 November 17 9pm	N	96 " "
1894 December 22 10am	N	85 " "
1897 January 25 3pm	NNW	86 " "
1900 February 16 5am	ESE	89 " "
1906 December 26 3pm	N by W	86 " "
1907 January 28 3pm	W	86 " "
1908 February 22 7pm	W	80 " "

When we commenced this paper we were labouring under the delusion that there were "equinoctial gales," but statistics have proved different to our anticipations. It is commonly supposed that the equinoctials are more pronounced in autumn than in spring. Undoubtedly gales do occur now and then at the autumnal equinox, but the Orkney statistics show conclusively that gales do not occur more frequently in the week around the 21st September than in the first week of October, and entirely dispose of the belief that is almost universal, at least in these islands, that there are equinoctial gales.

We give below the mean direction of wind for most of the period under consideration. It will there be noticed that there is a considerable increase in the N and NE winds, a decrease in the SE; with a favourable increase in the S. There is a very decided reduction in the W wind. We have heard much about the prevalence of the SW winds as they affect our

Atlantic currents, but the S and SE together are much more frequent than the SW and W, so that there is need to revise some of our current meteorological phraseology.

MEAN DIRECTION OF WIND.

YEARS.	N	NE	E	SE	S	SW	W	NW	Calm
1827-1841	72	34	54	144	96	80	126	90	34
1841-1859	72	36	78	116	96	74	144	78	50
1876-1890	73	42	49	106	102	88	115	95	61
1898-1904	84	44	69	104	123	99	106	88	32

In conclusion, the climate of Orkney is very much that of the east coast of Scotland. Its extremes of temperature are not so great. Its rainfall is slightly higher. The growth of vegetation is often greatly retarded in spring, considerably more so than on the mainland of Scotland. During April, May, and June, till midsummer day, spells of cold weather with N wind set in and prevent the progress natural to the season. Then sales, as those of 1890 and 1907, wither the growing grain and check vegetable growth for at least a fortnight. After that rapid progress takes place, and heavy crops are often produced. Harvests are generally a fortnight later than in Aberdeen, but seedtime is also much later. Bere, which is much grown on land where seaweed is available, has been often sown in the third week of May and cut in the second week of August, thus growing and ripening in eleven weeks. It has been known to do this in ten weeks, but that is unusual.

August 1908

[APPENDIX – TABLE A.

APPENDIX.

TABLE A .- TEMPERATURE RECORDS.
(Sandwick, 1827-1885; Swanbister, 1885-1891; Deerness, 1891-1906.)

YEAR.	Jan.	Feb.	Mar.	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	YEAR.
1827	35.1	35.1	38.6	43.8	49.2	53.4	55.6	55.0	54.3	51.0	43.1	43.2	46.5
1828	40.2	38.8	41.5	43.6	45.3	56.0	58.3	57.3	55.4	54.2	45.5	43.2	48.3
1829	36.1	39.5	40.7	41.5	50.0	53.4	57.1	54.4	50.2	45.6	41.4	39.5	45.8
1830	38.0	36.7	41.8	44.8	50.8	51.7	56.1	53.1	53.5	49.4	42.8	36.3	46.2
1831	36.7	37.7	42.7	44.9	48.7	56.1	57.9	58.9	54.7	51.7	40.5	44.1	47.9
1832	41.5	42.2	42.2	46.2	47.3	54.7	54.3	56.1	52.6	49.4	45.4	41.4	47.8
18:33	37.1	38.4	38.7	43.2	51.4	51.6	54.7	52.4	52.3	49.2	41.6	39.3	45.8
1834	38.9	40.2	41.1	43.1	48.8	58.0	58.0	56.9	52.9	48.1	44.0	45.2	47.9
1835	39.8	39.5	41.2	42.3	46.0	51.8	53.6	54.8	53.0	45.7	45.7	46.4	46.1
1836	39.1	37.5	39.6	41.4	47.8	52.0	52.5	51.8	48.4	45.9	40.9	38.66	44.6
1837	38.8	39.3	36.5	39.1	45.2	51.1	50.6	53.8	51.6	49.4	41.6	42.4	44.9
1838	33.6	31.3	38.6	39.2	44.8	48.2	53.9	52.3	50.3	45.8	39.7	41.8	43.3
1839	36.0	37.6	36.3	42.1	44.9	51.0	55.6	53.1	52.8	47.6	43.2	40.4	45.1
1840	38.8	38.0	41.4	45.9	44.8	50.2	52.4	55.7	49.7	46.4	42.2	39.8	45.4
1841	34.8	38.4	44.4	43.4	49.5	50.8	51.6	53.2	52.5	43.5	39.7	39.6	45.1
1842	37.7	40.4	41.1	45.3	50.3	53.3	54.4	56.7	52.9	46.5	40.2	45.0	47.0
1843	39.6	33.6	39.0	42.7	46.1	50.0	54.3	56.5	54.8	43.5	41.9	45.55	45.6
1844	40.1	34.2	39.5	46.3	47.9	50.5	52.9	53.5	51.0	46.4	43.6	38.2	45.3
1845	39.55	36.5	37.3	45.2	47.1	53.2	53.3	53.2	50.6	48.0	44.0	38.3	45.5
1846	42.4	43.1	40.2	42.6	48.6	57.3	56.5	58.8	55.4	49.4	46.0	38.2	48.2
1847	39.6	37.9	41.8	42.3	48.2	52.7	57.1	55.5	48.7	48.2	45.3	40.3	46.5
1848	38.4	38.4	41.2	42.2	50.5	52.5	53.8	53.6	52.3	46.6	41.7	41.4	46.0
1849	39.0	41.2	42.0	41.9	48.7	49.4	54.6	53.8	52.8	46.0	43.0	40.8	46.1
1850	37.1	41.9	41.4	41.3	46.9	53.6	56.4	54.0	51.3	45.6	42.6	42.7	46.5
1851	41.7	40.6	40.9	43.5	47.4	51.9	52.5	53.8	51.9	49.1	40.3	44.4	46.5
1852	40.3	39.9	42.0	47.6	50.5	55.3	61.4	60.6	53.5	46.9	41.5	40.7	48.4
1853	38.6	33.7	38.2	44.5	49.1	55.2	58.2	56.0	53.3	48.7	44.9	39.0	46.6
1854	36.5	39.2	45.1	44.7	48.4	52.9	55.3	55.1	55.1	46.4	42.1	39.1	46.6
1855	38.2	31.6	36.6	43.2	43.8	52.2	59.2	56.1	52.7	45.7	43.5	39.4	45.2
1856	38.0	40.8	40.4	44.6	46.8	51.5	54.8	53.2	50.8	48.8	40.2	39.4	45.8
1857	37.6	40.5	39.1	41.6	47.9	53.9	54.8	56.7	55.3	49.3	46.6	46.4	47.5
1858	41.4	38.3	38.6	41.9	47.3	55.0	53.4	56.6	53.7	44.4	41.2	42.5	46.2
1859	40.5	40.2	40.2	39.5	49.5	52.9	55.0	55.2	51.7	46.1	41.1	35.3	45.6
1860	37.0	35.8	38.4	41.0	46.9	50.3	53.4	52.2	49.6	44.9	40.3	36.2	43.8
1861	38.8	39.8	40.3	43.2	45.3	53.9	54.7	54.8	51.9	49.6	39.0	41.3	46.0
1862	39.6	40.2	35.8	41.8	48.8	50.3	51.5	53.6	52.6	47.3	40.5	43.6	45.5
1863	40.5	41.5	41.2	42.9	45.6	52.6	52.6	53.2	49.9	47.3	43.1	41.5	46.0
1864	38.5	34.6	37.0	44.5	46.6	51.2	54.2	52.6	52.0	45.9	43.4	41.7	45.2
1865	36.6	36.6	37.6	44.0	48.7	52.6	55.2	54.9	56.1	45.7	42.7	44.8	46.3
1866	40.3	36.9	38.4	42.3	46.1	54.0	53.5	53.3	50.2	49.7	42.1	41.5	45.7
1867	32.2	40.8	36.6	43.0	44.8	50.8	51.8	55.5	52.7	47.6	45.0	41.6	45.2
1868	38.6	41.3	42.0	44.5	50.1	53.1	57.0	55.9	51.7	46.1	40.0	41.4	46.8
1869	41.6	41.0	37.8	44.8	43.7	44.9	55.6	53.6	51.6	46.2	41.8	36.2	45.3
1870	38.9	36.4	39.0	44.8	47.9	51.6	55.2	55.8	52.9	46.8	41.3	35.2	45.5
1871	36.5	41.2	42.3	40.0	47.0	51.4	56.8	56.9	51.4	47.8	40.2	40.2	46.0
1872	40.2	41.1	41.3	44.1	46.0	53.7	56.6	54.3	50.5	46.6	41.8	39.7	46.3
1873	40.0	37.2	39.6	43.4	45.2	54.2	57.3	55.0	50.6	45.1	42.7	43.0	46.1
1874	41.8	41.0	42.6	44.8	46.4	51.6	56.7	53.5	52.4	47.6	42.2	35.0	46.3
1875	39.7	37.5	40.4	44.4	46.4*	52.2*	54.7	55.9	52.7	46.9	39.9	39.1*	45.8
1876	41.4	36.2	37.6	42.4	47.1	53.3	54.4	55.4	50.4	49.0	42.3	39.6	45.8
1877	37.7	38.4	39.1*	42.8*	44.3	51.6	54.5	52.2	49.9	46.4	43.3	41.0	45.1
1878	40.0	43.1	39.2	44.3	48.5	53.0	55.1	56.9	53.4	49.2	39.4	34.3	46.4
1879	35.3	35.8	36.9	40.1	44.5	50.8	53.2	54.4	51.6	47.0	42.7	40.2	44.4
1880	41.1	41.8	41.7	44.4	47.2	52.6	54.7	58.6	55.3	43.4	40.4	37.8	46.6
1881	33.7	35.5	36.3	41.0	47.8	50.1	54.1	51.9	52.2	46.2	45.2	41.0	44.6
1882	42.7	42.2	41.5	42.0	48.4	51.5	56.8	56.2	51.8	50.0	40.1	36.2	46.6
1883	39.9	40.6	36.6	44.8	46.4	51.1	55.0	54.2	52.1	47.2	42.1	41.8	46.0
1884	41.6	40.2	41.5	43.2	46.4	51.8	55.2	57.2	53.8	48.0	42.6	40.0	46.8
1885	38.4	37.9	40.1	43.2	45.0	50.0	54.7	51.6	50.4	42.6	42.4	40.6	44.7
1886	35.6	36.8	38.4	42.0	45.3	48.9	51.1	52.4	49.9	48.1	43.9	34.2	43.9

*Interpolated.

TABLE A.-continued.

YEAR.	Jan.	Feb.	Mar.	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	YEAR.
1887	39.7	40.6	40.7*	40.8	46.3	52.2	54.3	52.4	51.3	43.8	40.4	36.6	44.9
1888	39.7	35.2	35.6	41.4	44.2	48.9*	50.1*	50.6	51.3*	46.6*	41.6	41.2	43.9
1889	42.0	36.4	39.6	42.5	50.7	55.4	52.4	55.0	49.9	47.4	44.6	40.4	46.5
1890	40.7	39.2	40.0	42.9	50.0	51.8	52.8	54.2*	54.2	47.6	43.1	39.2	46.3
1891	38.1	43.0	38.3	41.2	44.4	49.4	53.0	52.2	52.4	48.7	43.7	40.4	45.4
1892	37.6	37.3	37.0	41.0	45.3	49.1	51.7	52.3	49.2	44.2	44.4	37.6	43.9
1893	37.7	37.8	41.2	44.4	48.2	52.3	53.9	55.2	50.9	47.0	39.6	41.4	45.8
1894	34.9	33.8	39.1	42.2	47.9	50.9	53.2	55.2	54.2	43.4	43.7	39.7	44.8
1895	38.2	38.0	41.5	44.8	45.1	51.4	55.4	53.7	50.6	46.6	46.1	41.6	46.1
1896	40.1	41.8	40.1	44.2	49.4	50.7	53.6	52.6	50.9	43.3	43.8	41.1	46.0
1897	36.7	38.5	39.6	41.0	44.1	49.9	53.9	55.4	50.0	48.5	44.7	41.6	45.4
1898	43.3	37.8	39.2	43.4	44.8	50.1	52.3	53.7	53.2	49.9	43.2	41.9	46.1
1899	38.5	40.6	38.7	40.7	45.3	52.2	55.5	54.8	50.2	47.7	47.0	40.2	45.9
1900	39.9	35.2	37.5	42.2	45.4	49.8	54.1	53.9	52.2	45.8	44.6	42.9	45.3
1901	40.0	36.9	38.6	42.6	47.8	50.6	55.3	53.7	53.4	47.1	42.4	38.8	45.6
1902	38.7	35.9	40.2	43.0	43.4	48.2	49.8	50.2	50.4	47.4	46.2	40.8	44.5
1903	39.3	40.8	40.5	39.6	45.9	49.2	51.3	51.9	51.1	47.0	42.1	40.8	45.0
1904	40.4	37.4	38.9	43.0	45.9	50.6	53.4	53.3	52.3	47.8	42.0	40.7	45.5
1905	40.6	38.8	41.5	39.7	46.0	51.7	55.1	53.7	51.3	43.5	41.6	42.7	45.5
1906	40.0	36.6	37.6	41.3	44.0	50.6	52.0	53.3	52.9	47.5	45.0	38.6	44.9

*Interpolated

MEAN TEMPERATURE FOR DECENNIAL PERIODS

YEAR	Jan.	Feb.	Mar.	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	YEAR.
1827-36	38.3	38.6	40.8	43.5	48.5	53.9	55.8	55.1	52.7	49.0	43.1	41.1	46.7
1837-46	38.1	37.2	39.4	43.2	46.9	51.6	53.5	54.7	52.2	46.6	42.2	40.9	45.6
1847-56	38.7	38.5	41.0	43.9	48.0	52.7	56.3	55.2	52.2	47.2	42.5	40.7	46.4
1857-66	39.1	38.4	38.7	42.3	47.3	52.7	53.8	54.3	52.3	47.0	42.0	41.5	45.7
1867-76	39.1	39.1	39.9	43.6	46.4	52.2	55.6	55.2	51.7	47.0	41.7	39.1	45.9
1877-86	38.6	39.2	39.1	42.8	46.4	51.1	54.4	54.5	52.0	46.8	42.2	38.7	45.5
1887-96	38.9	38.3	39.3	42.5	47.2	51.2	53.0	53.3	51.5	45.9	43.1	39.9	45.3†
1897-06	39.7	37.7	39.2	41.6	45.3	50.3	53.3	53.4	51.7	47.3	43.9	40.9	45.3†
1887-06	39.2	37.8	39.4	43.0	48.0	52.3	54.3	53.7	51.9	45.8	42.5	39.3	45.6‡
1897-06	40.0	37.2	39.3	42.1	46.1	51.4	54.6	53.8	52.0	47.2	43.3	40.3	45.6‡

† As read.

‡ Reduced to Sandwick Station.

TABLE B.-RAINFALL OF ORKNEY. (In inches.)
(Sandwick, 1841-1885; Swanbister, 1885-1891; Deerness, 1891-1907.)

YEAR.	Jan.	Feb.	Mar.	April.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.	YEAR.
1841	5.00	1.93	2.54	1.97	3.52	1.64	3.16	3.31	3.09	4.88	3.51	5.43	39.98
1842	3.28	2.20	3.98	0.51	0.98	2.34	1.88	4.69	3.13	5.68	3.88	4.44	36.99
1843	6.25	1.32	2.46	4.05	2.31	1.09	2.92	1.84	2.00	6.38	4.17	3.70	38.44
1844	4.42	3.22	3.68	1.28	1.60	2.32	1.17	2.86	1.99	4.52	3.25	1.77	32.08
1845	2.97	2.56	3.17	0.94	1.02	2.40	1.69	4.13	2.82	7.82	4.01	7.41	40.94
1846	4.38	3.34	3.47	1.95	1.88	1.60	2.13	2.91	0.60	3.55	3.27	3.97	33.05
1847	1.51	3.48	1.56	3.32	2.28	2.72	2.56	3.20	6.05	4.70	4.15	5.24	40.77
1848	2.80	5.57	2.79	1.15	1.78	2.67	3.37	2.04	1.56	3.97	6.23	3.87	37.80
1849	7.54	4.92	2.71	1.91	0.78	2.33	3.72	3.33	1.76	2.85	4.45	4.22	40.52
1850	3.81	4.98	2.43	2.20	1.84	1.99	1.16	4.61	4.05	7.32	6.81	3.11	44.31
1851	4.29	3.50	2.36	1.52	1.77	2.86	3.32	2.23	0.91	3.96	4.11	2.59	33.42
1852	5.23	3.81	0.78	0.11	1.42	3.05	2.58	0.62	2.64	4.12	5.18	5.04	34.58
1853	5.12	2.50	1.79	3.30	0.71	2.13	1.57	2.83	3.54	5.94	2.62	1.67	33.72
1854	4.72	4.10	1.65	1.42	1.61	1.85	2.52	2.40	4.18	5.21	4.82	7.75	42.23
1855	3.26	1.32	3.58	2.89	1.38	2.64	2.97	3.98	1.74	5.28	1.37	4.64	35.05
1856	2.33	2.42	0.34	0.34	0.89	2.36	3.36	1.40	3.18	1.01	4.61	5.17	27.41
1857	5.15	2.96	4.12	1.37	0.89	0.56	2.77	2.75	2.75	2.81	1.93	3.55	31.91
1858	3.78	0.74	2.71	0.86	2.43	2.24	4.05	2.64	2.80	5.89	2.83	3.40	34.37
1859	5.46	4.20	5.41	4.33	0.38	2.41	2.81	2.27	2.85	6.26	2.66	5.39	44.43
1860	3.00	1.81	3.40	1.23	2.28	3.85	1.99	4.88	4.65	5.49	3.51	5.02	41.11
1861	2.12	1.43	4.72	1.02	2.01	0.78	3.40	6.74	2.97	6.01	7.29	2.68	41.17
1862	4.02	1.42	1.85	2.27	2.86	2.33	2.52	2.25	3.01	5.69	2.38	3.78	34.38
1863	5.16	3.06	2.60	3.24	2.61	1.09	1.21	3.09	5.38	3.84	3.08	5.36	39.72
1864	1.37	3.78	2.69	1.23	1.88	1.90	1.63	2.60	3.69	3.66	4.69	4.16	33.28
1865	4.08	3.40	4.74	1.47	1.90	1.42	1.55	2.65	2.28	4.85	3.07	2.79	34.20
1866	4.33	5.63	3.08	1.21	2.15	1.87	1.64	3.24	2.65	2.76	8.24	4.76	41.56
1867	4.06	4.03	2.08	4.20	1.11	1.79	1.56	1.72	5.38	6.66	2.93	3.87	39.39
1868	4.50	5.81	4.27	3.31	1.51	2.80	1.35	5.32	1.41	5.34	2.66	5.15	43.43
1869	3.83	4.04	2.85	3.75	1.03	1.97	3.20	2.37	6.60	3.33	6.70	3.76	43.43
1870	2.31	2.92	1.25	2.77	1.67	1.70	1.33	1.11	3.30	3.17	3.67	5.52	30.72
1871	1.65	4.40	2.30	1.74	1.12	0.33	2.85	2.93	2.85	4.04	3.84	3.98	32.03
1872	4.44	2.16	2.04	2.40	1.69	3.52	2.57	3.40	3.50	4.72	5.02	4.41	39.87
1873	3.52	1.54	2.20	1.44	1.71	1.82	2.39	4.06	3.51	6.56	4.69	4.29	37.73
1874	4.98	1.39	3.46	2.10	1.51	1.67	2.75	5.00	4.86	4.10	4.00	3.44	39.26
1875	5.02	1.99	0.83	2.61	1.51	1.45	2.94	2.68	2.86	3.76	4.05	3.36	33.06
1876	2.92	3.58	4.28	2.23	1.32	1.45	3.15	2.56	3.18	3.80	4.70	5.85	39.12
1877	3.43	4.33	2.81	1.44	2.73	3.38	2.85	2.50	1.63	4.57	7.00	4.16	40.77
1878	3.76	1.98	4.03	0.24	2.91	1.23	2.52	1.40	5.90	4.87	3.61	5.70	38.17
1879	2.36	1.25	3.23	1.70	2.50	1.38	3.17	3.39	3.29	3.40	3.62	3.19	32.48
1880	2.40	3.91	2.91	1.72	1.66	2.30	3.55	1.00	4.16	4.28	4.28	4.54	36.71
1881	2.57	5.30	3.43	1.53	1.56	2.51	4.47	3.42	0.77	3.44	3.04	4.92	36.96
1882	3.15	3.20	5.81	1.90	1.37	3.43	2.44	2.59	3.04	3.10	4.02	4.72	38.77
1883	3.09	3.46	2.56	1.75	2.94	0.98	1.83	3.73	3.67	4.03	4.94	4.72	37.72
1884	5.33	1.34	3.63	0.76	2.08	1.59	2.54	2.81	1.69	5.93	4.38	4.31	36.39
1885	2.14	3.63	2.63	1.43	1.70	2.50	1.52	1.68	3.78	4.68	2.07	4.59	32.35
1886	4.79	1.84	1.52	1.86	1.97	2.21	3.12	2.31	1.82	2.33	3.36	6.14	33.27
1887	3.46	2.06	1.00	2.07	1.87	1.56	3.17	3.00	3.44	4.52	3.82	4.39	34.36
1888	2.78	3.51	3.29	2.02	2.92	1.13	1.76	2.64	1.70	5.03	5.68	2.94	35.40
1889	3.40	4.54	3.96	2.38	0.52	0.66	1.55	5.19	3.35	3.20	2.63	4.71	36.09
1890	4.00	1.57	4.16	1.26	2.02	3.17	3.32	2.93	3.86	5.53	7.14	2.08	41.04
1891	2.95	2.02	4.54	0.83	2.27	1.42	4.90	4.67	3.37	1.88	2.43	3.14	34.22
1892	4.77	3.24	1.45	2.02	3.12	2.12	2.67	3.25	3.29	4.72	3.91	2.38	36.94
1893	3.60	2.66	2.50	1.06	1.45	0.41	3.04	1.87	5.24	7.07	6.11	4.21	39.22
1894	4.01	3.72	2.22	0.48	2.37	1.67	4.71	3.90	0.74	2.88	1.41	2.99	31.10
1895	3.38	1.04	2.03	2.93	0.91	2.81	2.48	2.76	2.77	4.67	2.88	6.06	34.72
1896	3.31	2.49	3.18	1.66	2.01	3.19	3.12	3.01	6.23	5.80	2.67	5.19	41.86
1897	2.23	1.60	3.44	1.60	1.72	0.86	1.90	1.97	4.65	3.06	3.42	3.73	30.20
1898	3.64	5.88	3.59	2.68	3.33	1.21	2.68	3.04	4.11	3.51	4.42	6.45	44.56
1899	4.33	1.49	3.41	2.56	2.89	2.15	2.49	1.44	4.59	3.46	3.95	3.42	36.18
1900	3.50	2.47	1.94	2.15	1.29	1.36	3.30	1.93	2.99	4.77	3.87	4.37	33.94
1901	3.18	2.17	2.01	2.66	1.42	3.25	1.94	3.55	1.83	4.55	3.55	5.55	35.66
1902	3.27	2.22	3.05	1.51	1.89	1.51	2.48	2.67	2.39	2.74	1.54	3.79	29.06
1903	3.29	5.02	2.17	3.13	1.29	1.29	3.89	4.27	2.47	5.12	4.60	2.71	39.25
1904	3.43	2.62	2.15	4.28	1.64	1.71	1.07	2.84	2.24	3.52	3.23	4.46	33.19
1905	3.73	4.31	2.80	2.59	1.57	1.43	3.41	2.73	2.92	5.75	4.27	1.55	37.06
1906	3.24	3.59	2.18	2.18	3.02	1.02	2.45	3.05	3.10	2.85	4.82	4.86	36.36
1907	4.22	3.50	2.65	1.78	1.16	3.69	1.16	4.14	1.24	3.18	2.44	3.01	32.17

TABLE B. (continued.) - RAINFALL IN DECENNIAL PERIODS

YEAR .	Jan.	Feb.	Mar.	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	YEAR.
1841-50	4.20	3.35	2.88	1.93	1.80	2.11	2.38	3.30	2.70	5.17	4.37	4.32	38.49
1851-60	4.26	2.74	2.61	1.74	1.38	2.49	2.80	2.60	2.92	4.60	3.36	4.42	35.82
1861-70	3.58	3.56	3.01	2.45	1.87	1.76	1.94	3.11	3.67	4.53	4.47	4.18	38.13
1871-80	3.45	2.65	2.81	1.76	1.87	1.86	2.87	2.89	3.57	4.41	4.48	4.30	36.92
1881-90	3.47	3.05	3.20	1.70	1.90	1.97	2.57	3.03	2.71	4.18	4.11	4.35	36.24
1891-00	3.57	2.66	2.83	1.80	2.14	1.72	3.13	2.79	3.80	4.18	3.51	4.20	36.29
1901-07	3.49	3.35	2.43	2.60	1.71	2.00	2.34	3.32	2.31	3.96	3.50	3.70	34.68
Mean	3.72	3.05	2.82	1.99	1.81	1.97	2.57	3.01	3.09	4.43	3.97	4.21	36.65

TABLE C. - SUNSHINE OF ORKNEY.

YEAR .	Jan.	Feb.	Mar.	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	YEAR.
1880	Hrs. -	Hrs. 53	Hrs. 142	Hrs. 162	Hrs. 208	Hrs. 238	Hrs. 136	Hrs. 154	Hrs. 128	Hrs. 98	Hrs. 43	Hrs. 13	Hrs. -
1881	44	35	59	123	211	149	143	138	78	71	31	27	1109
1882	25	46	80	134	258	144	175	71	103	78	54	20	1188
1883	44	54	58	137	174	195	170	96	96	91	51	17	1183
1884	13	57	103	154	152	138	168	158	88	48	34	8	1121
1885	9	45	54	157	161	174	155	91	110	59	26	14	1055
1886	27	63	108	166	162	145	141	129	117	63	49	28	1198
1887	39	54	115	130	164	168	151	103	83	55	17	20	1099
1888	35	73	78	126	161	229	126	123	111	59	8	25	1154
1889	29	44	76	113	170	197	161	142	92	74	41	28	1167
1890	44	51	96	180	194	150	150	127	87	56	34	12	1181
1891	24	73	120	196	192	151	88	97	98	112	40	39	1230
1892	22	36	126	211	174	171	111	118	123	48	36	32	1208
1893	30	64	104	169	158	159	121	134	112	63	31	13	1149
1894	26	41	162	141	233	204	170	105	95	66	63	22	1328
1895	37	88	117	134	191	207	126	131	124	96	44	6	1301
1896	21	42	112	115	154	92	133	104	73	72	31	22	971
1897	39	52	73	180	186	167	208	170	130	96	22	29	1352
1898	34	49	130	121	201	124	138	170	107	99	53	12	1238
1899	37	77	104	164	208	178	150	111	115	78	15	15	1252
1900	29.7	64.8	91.8	115.5	140.5	86.1	138.8	156.2	98.9	85.1	27.8	25.0	1060
1901	26.5	57.5	91.5	190.7	193.6	165.1	122.9	130.0	112.6	92.7	46.0	23.7	1252.8
1902	35.9	39.7	98.0	169.4	188.4	157.1	102.0	107.5	79.9	100.6	33.8	13.6	1125.9
1903	25.3	33.6	96.6	132.5	143.7	140.8	128.8	130.9	130.0	83.3	43.0	27.8	1116.3
1904	24.7	47.7	86.0	144.3	189.6	177.9	108.2	112.0	130.1	80.6	46.4	19.1	1166.6
1905	19.8	51.4	65.4	112.1	151.6	193.9	159.4	128.3	133.7	62.2	40.1	19.6	1137.5
1906	40.2	83.9	97.4	200.9	131.8	145.2	167.1	123.3	174.8	78.5	27.6	15.5	1286.2
1907	25.9	76.7	129.7	152.6	177.7	136.9	102.8	84.1	138.7	72.2	41.1	28.0	1166.4
1881-07	29.7	55.5	101.1	154.1	178.5	160.9	141.3	121.8	108.8	75.5	36.5	20.8	1177.6