SYMONS'S

MONTHLY

# METEOROLOGICAL MAGAZINE.

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## JANUARY, 1884, IN THE UNITED STATES.

WHILE we in England during January were revelling in unnatural warmth, and were surrounded by a profusion of flowers almost spring-like, North America, especially the eastern part of the continent, was suffering so great an extreme of cold that in many cases the population suffered considerably, and live stock was frozen to death.

We have considered these conditions sufficiently important and interesting to call for a brief précis of the observations and remarks published in the *Monthly Weather Review* issued by the Signal Service of the United States. We have adhered to the arrangement adopted in the original, merely extracting the most striking facts, and adding a few notes and comments.

The first table gives the mean temperature for January, 1884, and the difference from the average of a series of years for the different districts; we quote all cases where the deficiency exceeds 5° and for some of them have been able to add the maximum departures from the normal temperature during the eleven Januarys 1873–83 :—

| DISTRICTS. | Mean, Jan. 1884. | Diff. from the average of several years. | Greatest departures, 1873-83. | |
|---|---|---|---|---|
| | | | Amount. | Year. |
| | ° | ° | ° | |
| Ohio Valley | 24·8 | —8·2 | ... | ... |
| Tennessee | 31·8 | —8·2 | .. | ... |
| Eastern Gulf States | 41·2 | —8·2 | ... | ... |
| Western Gulf States | 40·9 | —7·0 | —7·6 | 1881 |
| Upper Lake Region | 13·0 | —6·6 | —9·7 | 1875 |
| Lower Lake Region | 18·7 | —6·4 | —9·5 | 1875 |
| Upper Mississipi Valley | 17·9 | —6·0 | —11·6 | 1875 |
| Southern Slope | 39·0 | —6·0 | —8·9 | 1881 |
| Rio Grande Valley | 52·6 | —5·3 | ... | .. |

The general conditions of mean temperature are summed up as follows, and numerous remarks by the observers are added :—

"The month of January, 1884, was slightly warmer than the average in California, in the northern and middle slopes, and in the middle and southern plateau districts. A comparison of the mean temperatures for January in those districts with the normal, shows departures of from 0°·5 to 0°·9, except in Southern California, where it amounted to 1°·6. The mean temp. for the northern plateau does not differ from the normal for that district. In the North Pacific coast region, and in all districts east of the Rocky mountains, excepting the Northern and Middle Slopes, the mean temperature of the month has been below the average. A marked deficiency of 8°·2 occurred in the Ohio valley, Tennessee, and the Eastern Gulf States. In the Lake region, Upper Mississippi valley, West Gulf States, and Southern Slope, the deficiencies ranged from 6° to 7°. In the other districts east of the Rocky mountains, where deficiencies occurred, they varied from 2°·3 in New England to 5°·3 in the Rio Grande valley."

ALABAMA.

"*Green Springs, Hale County.*—Mean temp., 37°·6, is 9° below the mean of January, 1883, and is the lowest monthly mean that has occurred during the last ten years."

ILLINOIS.

"*Anna, Union County.*—Mean temp., 25°·6, is 7°·2 below the January average of nine years. The temperatures for two of the coldest months of which there is a record, are—

| | January, 1864. | | January, 1884. |
|---|---|---|---|
| Highest temperature ..... | 67° | ..... | 65° |
| Lowest ,, ..... ..... | —22° | ..... | —21° |
| Monthly mean temperature..... | 32°·2 | ..... | 25°·6 |
| Highest daily mean temperature | 58°·5 | ..... | 60°·0 |
| Lowest ,, ,, ,, | —11°·7 | ..... | —15°·0 |

"*Riley, McHenry County.*—Mean temp,, 9°·8, is 8° below the January average of the last 21 years, and is, with the exception of that for January, 1875, the lowest for the period named."

INDIANA.

"*Logansport, Cass County.*—Mean temp., 18°·6 is 11°·3 below the January average of the last 25 years."

MASSACHUSETTS.

"Mr. J. B. Hall, of *Worcester*, reports the mean temp. of January for a period of 45 years to be 29°·6 (?), and the mean for January, 1884, to be 20°·4, or 9°·2 (?) below the normal."

MISSOURI.

"*Saint Louis.*—Prof. Nipher, director of the 'Missouri Weather Service,' reports as follows : January has been unusually cold. The average temperature at the central station was 22°·3, which is 9°·1 below the normal January temperature for St. Louis, as shown by Dr. Engelmann's series for 49 years. The average January tempera-

ture was, however, lower than the mean for January, 1884, in the following years, viz., 20°·2 in 1856, 19°·3 in 1857, and 21°·3 in 1875."

NEW YORK.

"*Palermo, Oswego County.*—Mean temp., 14°·1, is 7°·5 below the January average of the last 31 years. The lowest January mean of that period, 12°·8, occurred in 1881."

OHIO.

"*Wauseon, Fulton County.*—Mean temp., 14°·5, is 9°·5 below the January average of the last 14 years. The lowest January mean of that period, 12°·2, occurred in 1875."

The absolute minimum temperatures for the month are next dealt with, and out of a total number of 162 readings, no fewer than 101 (63 per cent.) are below zero, 32 being below —25° and 4 below —40°.

A table is given of 64 Signal Service stations with comparisons with previous years, and all stations where the 1884 reading was the lowest, appear below :—

| State or Territory. | Minimum for January, 1884. | | Minimum in Previous years. | |
|---|---|---|---|---|
| | Station. | Temp. | Temp. | Year. |
| | | ° | ° | |
| Alabama | Montgomery | 8 | 14 | '73, '79 |
| Arkansas | Fort Smith | —5 | 2 | 1883 |
| Delaware | Delaware Breakwater | 9 | 10 | 1882 |
| Georgia | Atlanta | —1·3 | 9 | 1879 |
| ,, | Augusta | 14 | 15 | 1873 |
| Illinois | Chicago | —18·5 | —18 | 1879 |
| Indiana | Indianapolis | —25 | —22 | 1879 |
| Kentucky | Louisville | —19 | —10 | '74, '79 |
| Minnesota | Moorhead | —43 | —42 | 1882 |
| Missouri | St. Louis | —21·5 | —16 | 1875 |
| Nebraska | Omaha | —38 | —22 | 1879 |
| North Carolina | Charlotte | 5 | 11 | '79, '81 |
| Ohio | Columbus | —20 | —20 | 1879 |
| South Carolina | Charleston | 13 | 19 | 1873 |
| Tennessee | Knoxville | —16 | —14 | 1877 |
| ,, | Nashville | —10 | —8 | 1877 |

Many of these temperatures would appear much more striking if we compared them with corresponding readings for European stations, roughly, in the same latitude ; thus we have—

| | | Min. temp. | | | Min. temp. |
|---|---|---|---|---|---|
| Knoxville | Lat. 36 | —16° | Malta | Lat. 36 | 42°·7 |
| Nashville | ,, 36 | —10° | | | |
| Indianapolis | ,, 40 | —25° | Madrid | ,, 40 | 15°·8 |
| Columbus | ,, 40 | —20° | | | |

While of the four stations with minimum temperatures below —40° Montana, Poplar River, —48° ; Dakota, Fort Yates, —45°·5 ; Fort

Lincoln, —45°; and Minnesota, Moorhead, —43°, not one is nearly as far north as either Paris or London.

This, perhaps, is a rather needless comparison, for it simply shows that latitude alone is very little guide as to the climate of a station, but the following remarks clearly show by comparisons with previous years that the temperatures registered in January, 1884, were exceptionally severe.

*(To be continued.)*

## THE SUN GLOWS.

*The Sun Glows.* By HENRY A. HAZEN. (Excerpt "American Journal of Science." March, 1884. 8vo.)

THIS is a very business-like paper, as will readily be seen by the following extracts :—

It is the purpose of this article to give :

1st. A general idea of the earliest appearances of the phenomenon. 2nd. To describe what may be seen by an ordinary observer even to-day. 3rd. To present the vapor theory and answer objections. 4th. To show why the "volcanic ashes" and "cosmic dust" hypotheses are untenable.

Remarkable sunset phenomena are reported as occurring on various dates at the following places :—

| Date. | Place. | Lat. | Long. |
|---|---|---|---|
| 1883, Aug. 28. | Mauritius | 20°S. | 57°E. |
| 30. | Maranham, Brazil | 2 S. | 44 W. |
| Sept. 1. | New Ireland | 5 S. | 152 E. |
| 2. | Venezuela | 10 N | 65 W. |
| 5. | Hawaii | 20 N. | 156 W. |
| 8. | Ceylon | 7 N. | 80 E. |
| 15. | South Australia | 38 S. | 143 E. |
| 20. | Cape of Good Hope | 35 S. | 20 E. |
| Oct. 8. | Florida | 29 N. | 82 W. |
| 19. | Yuma, California | 33 N. | 114 W. |
| Nov. 9. | England | 52 N. | 0 |
| 20. | Turkey. | | |
| 27. | British Columbia, Ala., Cal., Conn., Dak., Fla., Ga., Ills., Ind., Iowa, Kans., Me., Md., Mass., Mich., Mo., Neb., N. H., N. Y., N. C., Pa., Va., Wis, Germany, Italy, Spain, France, Sweden, England. | | |

Allowing for cloudiness, on certain days, it will be seen that before September 8th a belt of the earth's surface 15° on either side of the equator was suddenly visited by the phenomenon. At first sight it might appear that there was a regular progression from the Indian Ocean westward, but on that supposition it would be hardly possible to explain why Venezuela should have seen the glow six days earlier than Ceylon, though somewhat farther north. The phenomenon might have been seen at Hawaii and even at Ceylon the last of August had it not been for cloudiness; and granting this, it is plain that appearances might have been well nigh instantaneous over the regions near the equator. The glow was marked at Yuma on October 19, 20 and 21, after which

it ceased for a month. It was first seen in the eastern United States on October 30th, when the appearance was very brilliant; the same sight presented itself the next night, but after that it did not again appear as bright, though carefully looked for, until November 27th. On this night the spectacle in the south-west was grand, and acknowledged by all as the finest even to the present time. The fire engines at Poughkeepsie, N. Y., and at New Haven, Conn., were summoned to "quench the burning skies." On the succeeding night the scene was nearly the same. Since November 28th the phenomenon has continued more or less brilliant, and with a few complete absences it has appeared down to the present (Feb. 3rd, 1884.)

A very remarkable fact is to be noted in connection with the display of November 26th and 27th, and that is, the sudden brightening over an immense region extending over half of Europe, over nearly the whole of the United States and British Columbia, though it had not been specially noted for about a month previous.

The author believes the phenomena to be due to vapour or ice particles at a great elevation, but we do not see that he deals with the fact that there are no records of the unusual prevalence of halos, parhelia, &c., which we have been taught to consider as connected therewith.

We do not see that the author states how the vapour got to, or remained at, such an exceptional altitude as the duration of the glows after sunset indicated.

Lieut. Hazen's remarks upon the Krakatoa dust theory we reprint verbatim.

A most singular hypothesis has been advanced to account for the material in the sky, namely, that the volcanic action at Krakatoa on August 26th and 27th ejected, into the atmosphere, immense masses of ashes which have been distributed by air currents over the earth's surface. Vivid accounts of the terrific nature of this convulsion, whereby a mountain island 2000 feet in height was perceptibly lowered, have been published by eye-witnesses. The position of the volcano was in lat. 6° 12′ S., long. 105° 28′ E. By comparing this position with the dates and positions of the first appearance of the after-glows as already given, it would seem as though there had been a natural progression, but it has been shown that an instantaneous appearance will account for the phenomena as easily. The following are advanced as a few of the objections to this theory.

1st. There must have been sufficient material ejected to cover more than 135,000,000 square miles (the earth's surface 45° both sides of the equator). The attempt to add to this quantity by instancing isolated and slightly active volcanoes thousands of miles away can be regarded only as an endeavour to support a weak cause.

2nd. There must have been currents of nearly equal force acting in opposite directions at the same height in the atmosphere, an impossible condition Meteorology has established that if anything there is a steady current in the upper regions from west to east.

3rd. The upper currents must have had sufficient velocity to carry the ashes a distance of 12,000 miles in 150 hours, or at a rate of 80 miles per hour toward the west. We know little of velocities of air-currents at great heights, but they are probably slight. The summer velocity on Mt. Washington, 6299 feet

above sea, is less than 30 miles per hour; while on Pike's Peak, 14,134 feet in height, it is only 20 miles per hour. The conditions certainly are very diverse at the two stations, and it is possible that the Mt. Washington velocities are 15 per cent. too high, but, allowing for these, there seems to be a possibility of a gradual diminution in wind velocity at increasing heights above the earth's surface.

4th. That the ashes must have been mechanically distributed first along a belt near the equator, and afterward, without addition, except possibly of a meagre character, the currents must have been sufficiently uniform over the whole earth, to have borne them north and south to above latitude 45°. This is well nigh incredible. It seems probable that in a few radial lines from Krakatoa, ashes could have been carried 1,500 or 2,000 miles, and some sporadic cases even greater distances. Professor Loomis, in his Meteorology, gives an instance in which volcanic ashes were carried 1,200 miles in a single direction, nearly parallel to the equator, but it is more than likely that these were carried in comparatively narrow streams, and that almost the entire mass of matter ejected from a volcano returns to the earth within a few hundred miles. A good illustration of the nature of a stream of volcanic ashes is given by Mr. Whymper, in a recent number of "Nature." He gives a description of a cloud of ashes poured forth from the crater of a volcano, carried in a stream in one direction and afterward in another at right angles, but that there was no uniform distribution is plainly shown by the narrative.

5th. That the intermittent nature of the phenomenon precludes the idea of a dust envelope.

6th. That ashes are opaque, while the appearances indicate great transparency.

The author's final paragraph is one which few will dispute :—

While all explanations of the glows are more or less matters of conjecture, yet the field of conjecture is believed to be narrowing, and we may hope ultimately to reach a satisfactory conclusion.

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## "THE WINTER OF 1883–84."

*To the Editor of the Meteorological Magazine.*

SIR,—Referring to Mr. Harvey's letter under the above heading, I have ventured to send you my figures to compare with his.

| | | | |
|---|---|---|---|
| Mean temp. ..... .. | 41°·7 | Frosty nights .... ..... | 17 |
| Absolute max. ... ... | 51 ·0 | Total rainfall ..... | 8·93 in. |
| ,, min. ..... | 21 ·0 | Wet days .... ..... ... | 64 |

The above figures show that here it has been a very mild and very wet winter. The difference in the number of frosty nights is remarkable, as well as in the number of wet days, between Mr. Harvey's record and mine. The rainfall has been above the average of the previous eleven winters, being 8·93 in. against 8·74 in.; whilst the number of wet days (64) is the greatest in any year except 1877. I may also say that the winter of 1880-81 was at once the coldest and the driest I ever recorded.—Yours respectfully, S. KING.

*Elswick Lodge, near Garstang, March 27th, 1884.*

## ROYAL METEOROLOGICAL SOCIETY.

THE usual monthly meeting of this Society was held on Wednesday evening, the 19th inst., at the Institution of Civil Engineers, Mr. R. H. Scott, F.R.S., President, in the chair. Messrs. W. Baily, M.A., W. L. Blore, A. L. Ford, H. Leupold, A. F. Lindemann, F.R.A.S., and Rev. E. B. Smith were elected Fellows of the Society.

The President read a paper entitled, "Brief Notes on the History of Thermometers." He stated that the subject had been handled in a comprehensive manner by Mons. Renou a few years ago, in the *Annuaire* of the French Meteorological Society, so that he should merely mention some of the leading points. The name of the actual inventor of the instrument is unknown. The earliest mention of it, as an instrument then 50 years old, was in a work by Dr. R. Fludd, published in 1638. Bacon also, who died in 1636, mentions it. The earliest thermometers were really sympiezometers, as the end of the tube was open and plunged into water, which rose or fell in the tube as the air in the bulb was expanded or contracted. Such instruments were of course affected by pressure as well as temperature, as Pascal soon discovered. However, simultaneously with such instruments, thermometers with closed tubes had been made at Florence, and some of these old instruments were shown at the loan collection of scientific apparatus at South Kensington in 1876. They are in the collection of the Florentine Academy, and in general principle of construction they are identical with modern thermometers. Passing on to the instrument as we now have it, Mr. Scott said that most of the improvements in construction in the earliest days of the instrument were due to Englishmen. Robert Hooke suggested the use of the freezing point; Halley the use of the boiling point, and the employment of mercury instead of spirit; and Newton was the first to mention blood heat. Fahrenheit was a German by birth, but was a protégé of James I., and died in England. Réaumur's thermometer in its final form owes its origin to De Luc; while the Centigrade thermometer, almost universally attributed to Celsius, was really invented by Linnæus. Celsius's instrument had its scale the reverse way, the boiling point being 0°, and the freezing point 100°. Mr. Scott then gave a brief account of some of the principal forms of self-registering and self-recording thermometers.

After the reading of this paper, the meeting was adjourned, in order to afford the Fellows and their friends an opportunity of inspecting the Exhibition of Thermometers and of Instruments recently invented. This Exhibition was a very interesting one, and embraced 136 exhibits. The thermometers were classified as follows:—(1) Standard, (2) Maximum, (3) Minimum, (4) Combined Maximum and Minimum, (5) Metallic, (6) Self-Recording, (7) Solar Radiation, (8), Sea, (9) Earth and Well, (10) Thermometers used for Special Purposes, (11) Thermometers with various forms of bulbs,

scales, &c., and (12) Miscellaneous Thermometers. In addition to these, there were also exhibited various patterns of thermometer screens, as well as several new meteorological instruments, together with drawings, photographs, &c.

## SPECTROSCOPIC WEATHER FORECASTING.

*To the Editor of the Meteorological Magazine.*

SIR,—I send you a summary of daily forecasts by Grace's rain-band spectroscope for the last three months.

I keep the record under seven different heads, and even in the most settled weather I find variations, so that on scarcely two consecutive days do I ever get exactly the same reading, although the total value of the observation may be the same.

I usually observe at 9 a.m., but on several occasions in January I have had to take a second observation at about 11, owing to insufficiency of light at 9 a.m.

I have, I think, been rather inclined to favour the spectroscope in the summarised results, and have never entered the forecast as (F.) false unless it was utterly and entirely wide of the mark.

On two of the wettest days the spectroscope gave no warning at all, viz., January 26th and 31st; on two other days February 19th and March 4th, it gave a very valuable warning in contradiction to the barometer. On one day, February 15th, it threatened a good deal of rain, but it proved one of the finest days of the month.—I am, Sir, yours truly,

JOHN T. HARDING.

*Pentwyn, near Monmouth, April 2, 1884.*

| 1884 | No. of Observations. | True. | Approximately True. | False. |
|---|---|---|---|---|
| January | 31 | 19 | 9 | 3 |
| February | 29 | 16 | 5 | 8 |
| March | 31 | 22 | 7 | 2 |

## RAINFALL AT UPPINGHAM.

BY the kindness of the Rev. G. H. Mullins, M.A., F.R.Met.Soc., we have the pleasure of issuing with this number a summary of the rainfall at Uppingham for the past ten years. It is remarkable as being one of the few stations at which July is the month of greatest rainfall, but its excess above October is evidently due to the storms of July 1875 and 1880. This prevalence of a maximum in July seems characteristic of the very central position of Rutland, for on referring to the investigation of seasonal rainfall in the *British Association Report*, 1873, it will be found that almost identical values are given by the observations made at Lyndon in Rutland between 1740 and 1789, and they are almost the only records which give a maximum in that month.

## WHITE FROST FOLLOWED BY GALES.

*To the Editor of the Meteorological Magazine.*

SIR,—I hope you will not be annoyed by my asking for an explanation of the following meteorological puzzle.

Hoar frost in autumn and spring is in this part of Ireland regarded as a sure precursor of rainy stormy weather, and I have frequently observed that the arrival of gales, *foretold by American telegraph*, is often preceded by hoar frost.

A typical instance occurred to-day, although no warning of a storm was given, and the forecast was for northerly breezes and fine weather.

Yesterday, Friday, was a dull close day with local showers. The max. temp. was 51°. The evening was gloomy, chilly, and the wind, very light, was northerly.

During the early part of the night the clouds dispersed, and as the temperature fell, thin mist rose from the S., while the surface air was moving from the N.

The minimum recorded 31°, 4 feet above ground. At sunrise the sky was almost cloudless, and a thick hoar frost lay on the grass. A very light southerly breeze was noted, and a bank of cirro-stratus was observed in the W., which gradually spread over the sky.

Between 11 and 12 a.m., a S.W. gale sprang up, and blew fitfully with slight showers till noon, when the wind backed to S.S.W. and S. From that hour until 4 p.m. the gale continued with heavy driving showers. About 5 p.m. the wind lulled, veered to W.S.W. and W., the clouds broke up, and by 5.15 p.m. the sun was shining brightly. At 6 p.m. a bank of dark nimbi hid the western horizon, and the wind was N.W.

I have minutely described this storm as it is a typical one, very like many of our autumn and spring gales.

What puzzles me is the frosty night that foretels these storms. Is there any scientific explanation of this calm, and accompanying fall of temperature, preceding a storm advancing across the Atlantic.

That a fall of temperature below 32° on a coast washed by a sea of from 50° to 55° should induce a storm is easily explained; but why does the temperature so often fall in anticipation of a storm? There may be a very simple explanation of this, but no one hereabouts can give it.—Yours truly, JAMES WISE.

*Rostellan Castle, Co. Cork, March 10th, 1884.*

| | in. | | in. |
|---|---|---|---|
| March 7th, 6 p.m. ..... | 29·805 | March 8th, 5 p.m. ..... | 29·369 |
| ,, 7th, 10 p.m. ..... | 29·855 | ,, 8th, 6 p.m. ..... | 29·397 |
| ,, 8th, 8 a.m. ..... | 29·793 | ,, 8th, 7 p.m. ..... | 29·415 |
| ,, 8th, 12 a.m. ..... | 29·651 | ,, 8th, 9 p.m. ..... | 29·433 |
| ,, 8th, 2 p.m. ..... | 29·558 | ,, 8th, 10 p.m. ..... | 29·443 |
| ,, 8th, 4 p.m. ..... | 29·456 | | |

| | | | | |
|---|---|---|---|---|
| March 7th ..... | Max. 51° ..... | Min. 45° ..... | Rainfall | 0·04 |
| ,, 8th ..... | ,, 46° ..... | ,, 31° ..... | ,, | 0·23 |
| ,, 9th ..... | ,, 46° ..... | ,, 34° ..... | ,, | |

[Considering that a satisfactory reply to this question would be of

public utility, we forwarded the letter to the Hon. Ralph Abercromby, and have been favoured with the following clear and interesting reply.—ED.]

*To the Editor of the Meteorological Magazine.*

SIR,—The calm, frosty night which often precedes a gale, to which your correspondent, Mr. Wise, alludes, is well known and forms the subject of several popular prognostics.

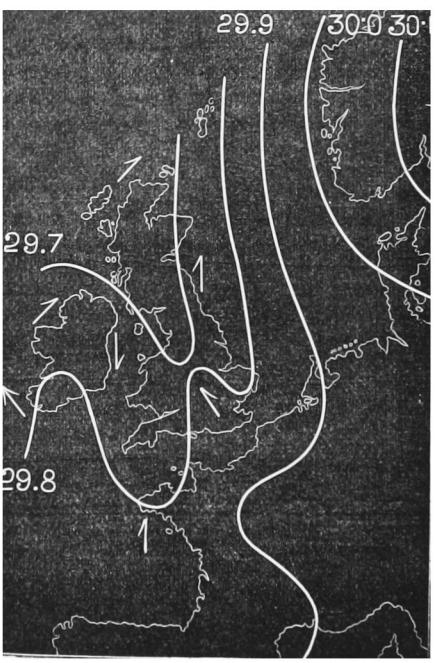
The explanation is very simple, though it is only within the last few years that it has been possible to give the true solution.

The greater portion of all our wind and rain comes from the action of cyclones, and one large class of these is always preceded by a curious wedge-shaped patch of high pressure, just as some big waves are preceded by a small ripple.

In this wedge of high pressure the air is calm, and the sky always clear. This is the primary condition; the cold is secondary. During the greater part of the year, a calm air and clear sky give full play to the radiation of the season, and white frost is deposited during the night. As the day goes on the cyclone, of which the wedge is as it were the satellite, comes on with wind and rain.

We may, therefore, give the answer to your query thus—a frosty night sometimes precedes wind and rain, because many cyclones develope an area of calm and clear sky in front of, and as a portion of, themselves.

But perhaps all this will be more intelligible to those who are unfamiliar with the modern methods of handling questions about weather, if we give an illustration of the isobars on the day to which



your correspondent refers. In the figure I therefore give the isobars and a few wind arrows, at 8 a.m. on Saturday, March 8th, 1884. We will confine our attention to the isobar of 29·8 inches only. In that line we see a loop of lower pressure over Cornwall; this is a secondary cyclone. In front of this there is a small wedge of higher pressure nearly over Oxford. Over the south of Ireland there is another larger wedge, and if we could have seen further out into the Atlantic, we should have found another small cyclone to the west of Valentia.

The frost which Mr. Wise observed was due to the action of this second wedge, and the gale which followed later on in the day was caused by the cyclone coming in from the Atlantic. In the course of the day some complications occurred, which gave rise to the apparently irregular backing of the wind. These, however, though all explicable, would take too much space if I were to endeavour to detail them.

A full account of the weather in wedges of high pressure, and of the prognostics which are associated with them, will be found in the Quarterly Journal of the Royal Meteorological Society, vol. ix., p. 27, "Abercromby and Marriott on Popular Weather Prognostics."

Yours sincerely,

RALPH ABERCROMBY.

*21, Chapel Street, Belgrave Square, London, S.W.*
*March 12th, 1884.*

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## COLONEL WARD'S LETTER ON THE SUNSETS.

WE have been requested by Col. Ward to make it known that the letter published upon page 22 of this volume was a private letter, and was not intended for publication.

Considering that the letter in question was the only one received from Col. Ward, and that in the first paragraph of it he said, "I hasten to reply to your note appended to my letter," *i.e.*, to the note on page 10 of this volume, we at once accepted it as his formal reply; but we have complied with his latest wish.

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## THE AMERICAN METEOROLOGICAL JOURNAL.

WE hear with extreme pleasure that we may soon expect to receive the first number of the above periodical. It will be edited by Prof. M. W. Harrington of the Detroit Observatory, and he will be assisted by some of the most able meteorologists in the States. The effort has our warmest approval, and we venture to suggest that European meteorologists might with advantage put "The American Meteorological Journal, Detroit Observatory, Ann Arbor, Michigan," on their list of exchanges.

## CLIMATOLOGICAL TABLE FOR THE BRITISH EMPIRE, SEPT., 1883.

| STATIONS. (*Those in italics are South of the Equator.*) | Absolute. Maximum. Temp. | Absolute. Maximum. Date. | Absolute. Minimum. Temp. | Absolute. Minimum. Date. | Average. Max. | Average. Min. | Average. Dew Point. | Average. Humidity. | Absolute. Max. in Sun. | Absolute. Min. on Grass. | TotalRain. Depth. | TotalRain. Days. | Aver. Cloud. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | ° | | ° | | ° | ° | ° | 0–100 | ° | ° | inches | | 0–10 |
| England, London | 75·3 | 18 | 41·4 | 23 | 66·7 | 50·2 | 53·0 | 84 | 120·7 | 35·4 | 3·83 | 18 | 6·0 |
| Malta | 93·0 | 3 | 62·9 | 29 | 80·5 | 67·1 | 63·8 | 71 | 143·9 | ... | ·38 | 5 | 2·3 |
| *Cape of Good Hope* | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... |
| *Mauritius* | 76·6 | 18 | 58·5 | 9 | 74·9 | 64·7 | 59·7 | 71 | ... | ... | 1·07 | 13 | 5·9 |
| Calcutta | 90·7 | 24 | 75·2 | 30 | 87·8 | 78·4 | 78·2 | 87 | 159·3 | 70·3 | 6·96 | 20 | 8·2 |
| Bombay | 84·9 | 19 | 73·5 | 23 | 83·0 | 75·2 | 74·9 | 87 | 147·2 | 68·9 | 12·37 | 24 | 8·7 |
| Ceylon, Colombo | 87·7 | 14 | 74·8 | 20 | 85·9 | 77·9 | 72·4 | 73 | 146·0 | 69·0 | 3·30 | 7 | 8·2 |
| *Melbourne* | 76·2 | 11 | 36·4 | 29 | 61·9 | 44·8 | 42·9 | 71 | 129·4 | 26·4 | 1·64 | 12 | 5·9 |
| *Adelaide* | 76·3 | 30 | 40 9 | 5 | 62·6 | 46·3 | 43·7 | 67 | 139·8 | 31·5 | 1·86 | 20 | 4·6 |
| *Wellington* | 60·0 | 5 | 34·3 | 19 | 54·2 | 43·9 | ... | ... | 125·0 | 32·0 | 3·72 | 20 | ... |
| *Auckland* | 65·0 | 4 | 41·0 | 11, 13 | 60·7 | 47·3 | 44·1 | 69 | 137·0 | 33·5 | 1·84 | 15 | 5·9 |
| *Falkland Isles* | 51·0 | 10 | 26·9 | 13 | 44·1 | 35·7 | 35·4 | 86 | 113·0 | 25·8 | 1·43 | 20 | 7·1 |
| Jamaica | 90·3 | 6 | 71·7 | 16 | 88·0 | 74·0 | 74·5 | 84 | ... | 66·5 | 3·63 | ... | 7·7 |
| Barbados | 84·0 | 5,9* | 70·0 | 29 | 82·0 | 73·0 | 74·5 | 84 | 152·0 | 63·0 | 7·04 | 20 | 6·0 |
| Toronto | 75·1 | 1 | 33·4 | 4 | 63·5 | 45·6 | 48·5 | 76 | 133·5 | 27·0 | 2·38 | 14 | 5·3 |
| New Brunswick, Fredericton | 80·7 | 13 | 29·0 | 29 | 68·4 | 42·3 | 45·6 | 73 | ... | ... | 1·71 | 8 | 4·5 |
| Manitoba, Winnipeg | 82·1 | 12 | 19·0 | 30 | 63·6 | 39·2 | 41·7 | 75 | ... | ... | 1·25 | 6 | 5·2 |
| British Columbia, Yale | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... |

* And 29

### REMARKS, SEPTEMBER, 1883.

MALTA.—Mean temp. 73°·9, mean pressure 29·998 in.; average velocity of wind, 10·2 miles; temp. of sea ranged from 79°·5 to 74°·0; severe TS on 13th.—J. SCOLES.

*Mauritius.*—Rainfall ·55 in. below, and mean temp. 0°·1 above the average; mean pressure 30·194 in.; mean hourly velocity of wind 12·3 miles, extremes 27·6 miles and 1·6 miles, prevailing direction E.S.E. The clouds and sky at sunrise and sunset were coloured more frequently and to a greater extent than usual; probably partly due to the presence in the air of volcanic dust from Sunda. C. MELDRUM, F.R.S.

COLOMBO.—No TSS occurred during the month; from the 8th until about the 15th the rising and the setting of the sun was of an unusual green colour. J. STODDART.

*Melbourne.*—Mean temp. of air and of dewpoint each 0°·7 below the average; mean pressure humidity and amount of cloud all about the average; rainfall ·72 in. below it; prevailing direction of wind S.W. and S.; strong breezes on 5 days; heavy squalls on 3rd, 4th and 5th; heavy dew on 9 days; thick fog on 16th; hoar frost on 29th; sheet L on 18th; T and L on 22nd. R. L. J. ELLERY, F.R.S.

*Adelaide.*—This month was the coldest September (with one exception) during 26 years, the mean temp., 54°·4, being nearly 3° below the average, while the max. was only 76·3; the amount of cloud was rather less, and the rainfall slightly in excess of the average. C. TODD.

*Wellington.*—On the whole a showery month, though with some fine bright days; prevailing winds S.E., at times squally; cold towards the end of the month, with H on 17th and 30th, and S on hills on the latter day, slight earthquake on 27th; mean pressure ·057 in. above, and mean temp. 2°·2 below the average. R. B. GORE.

*Auckland.*—Weather generally fine, with unusually small rainfall, not half the average; mean pressure and temp. above the average. T. F. CHEESEMAN.

BARBADOS.—Mean temp. 76°·7, slightly above the average; mean hourly velocity of wind 7·5 miles, extremes 12·9 miles and 3·2 miles; rainfall 19 per cent. below the average; 10 days were overcast and clouded; TS on 16th; the sun appeared various colours on the evening of the 15th, and morning of 16th. R. BOWIE WALCOTT.

# SUPPLEMENTARY TABLE OF RAINFALL, MARCH, 1884.

[For the Counties, Latitudes, and Longitudes of most of these Stations, see *Met. Mag.*, Vol. XIV., pp. 10 & 11.]

| Div. | STATION. | Total Rain. | Div. | STATION. | Total Rain. |
|---|---|---|---|---|---|
| | | in. | | | in. |
| II. | Dorking, Abinger ..... | 2·29 | XI. | Carno, Tybrith ... ..... | 3·39 |
| ,, | Margate, Birchington... | 1·08 | ,, | Corwen, Rhug ..... | 2·95 |
| ,, | Littlehampton .. ..... | 1·84 | ,, | Port Madoc ..... | 3·64 |
| ,, | Hailsham ..... | 2·31 | ,, | I. of Man, Douglas ..... | 3·21 |
| ,, | I. of W., St. Lawrence. | 1·84 | XII. | Stoneykirk, Ardwell Ho. | 3·02 |
| ,, | Alton, Ashdell..... | 2·55 | ,, | Melrose, Abbey Gate .. | 2·46 |
| III. | Winslow, Addington ... | 1·42 | XIII. | N. Esk Res. [Penicuick] | 2·40 |
| ,, | Oxford, Magdalen Col... | 1·41 | XIV. | Ayr, Cassillis House .. | 2·23 |
| ,, | Northampton ..... | 1·27 | ,, | Glasgow, Queen's Park. | 2·29 |
| ,, | Cambridge, Beech Ho... | ·69 | XV. | Islay, Gruinart School.. | 4·26 |
| IV. | Southend ..... | 1·07 | XVI. | St. Andrews, Newton Bk | 2·87 |
| ,, | Harlow, Sheering ... .. | 1·46 | ,, | Balquhidder, Stronvar.. | 7·94 |
| ,, | Diss ..... | 1·25 | ,, | Dunkeld, Inver Braan.. | 4·90 |
| ,, | Swaffham ..... | 1·35 | ,, | Dalnaspidal H.R.S. ... | 4·14 |
| ,, | Hindringham ..... | ... | XVII. | Keith H.R.S. ..... ..... | 2·50 |
| V. | Salisbury, Alderbury... | 2·49 | ,, | Forres H.R.S. ..... ... | 1·05 |
| ,, | Warminster ..... | 3·09 | XVIII. | Strome Ferry H.R.S.... | 4·98 |
| ,, | Calne, Compton Bassett | 2·27 | ,, | Lochbroom ..... | 3·61 |
| ,, | Ashburton, Holne Vic.. | 7·76 | ,, | Tain, Springfield..... | 1·35 |
| ,, | Holsworthy, Clawton... | 3·27 | ,, | Loch Shiel, Glenaladale | 8·64 |
| ,, | Lynmouth, Glenthorne. | 3·80 | ,, | Invergarry ..... | 4·58 |
| ,, | Probus, Lamellyn ..... | 3·81 | XIX. | Lairg H.R.S. ..... | 1·64 |
| ,, | Wincanton, Stowell Rec. | 2·97 | ,, | Forsinard H.R.S. ..... | 2·67 |
| ,, | Taunton, Fullands ..... | 1·76 | ,, | Watten H.R.S. ..... | 2·52 |
| VI. | Bristol, Clifton ..... .. | 2·69 | XX. | Dunmanway, Coolkelure | 9·57 |
| ,, | Ross ..... | 2·62 | ,, | Fermoy, Gas Works ... | 3·65 |
| ,, | Wem, Sansaw Hall..... | 1·84 | ,, | Tralee, Castlemorris ... | 5·16 |
| ,, | Cheadle, The Heath Ho. | 2·24 | ,, | Tipperary, Henry Street | 3·23 |
| ,, | Worcester, Diglis Lock | 2·49 | ,, | Newcastle West ..... | 2·42 |
| ,, | Coventry, Coundon ..... | 2·31 | ,, | Miltown Malbay..... | 4·33 |
| VII. | Melton, Coston ..... | 1·36 | ,, | Corofin ..... | 4·48 |
| ,, | Ketton Hall [Stamford] | 1·01 | XXI. | Carlow, Browne's Hill.. | 2·88 |
| ,, | Horncastle, Bucknall ... | 1·37 | ,, | Navan, Balrath ..... | 1·87 |
| ,, | Mansfield, St. John's St. | 2·49 | ,, | Mullingar, Belvedere ... | 2·69 |
| VIII. | Macclesfield, The Park. | 2·58 | ,, | Athlone, Twyford ..... | 5·02 |
| ,, | Walton-on-the-Hill..... | 2·65 | XXII. | Galway, Queen's Col.... | 3·52 |
| ,, | Lancaster, South Road. | 3·34 | ,, | Clifden, Kylemore ..... | ... |
| ,, | Broughton-in-Furness .. | 5·31 | ,, | Crossmolina, Enniscoe.. | 5·89 |
| IX. | Wakefield, Stanley Vic. | 1·20 | ,, | Carrick-on-Shannon ... | 5·06 |
| ,, | Ripon, Mickley ..... | 2·61 | XXIII. | Dowra ..... | .. |
| ,, | Scarborough..... | 2·16 | ,, | Rockcorry..... | 1·77 |
| ,, | East Layton [Darlington] | 3·16 | ,, | Warrenpoint ..... | 4·17 |
| ,, | Middleton, Mickleton .. | 1·83 | ,, | Newtownards ..... | 2·12 |
| X. | Haltwhistle, Unthank.. | 2·06 | ,, | Belfast, New Barnsley . | 3·87 |
| ,, | Shap, Copy Hill ..... | 5·31 | ,, | Cushendun ..... | 4·22 |
| XI, | Llanfrechfa Grange .... | 3·73 | ,, | Bushmills ..... ..... | 3·01 |
| ,, | Llandovery ..... | 3·83 | ,, | Stewartstown ..... | 3·47 |
| ,, | Solva ..... | ... | ,, | Donegal, Revelin Ho.... | ... |
| ,, | Castle Malgwyn ..... | 5·76 | ,, | Buncrana ..... | 2·44 |
| ,, | Rhayader, Nantgwillt.. | 5·51 | ,, | Carndonagh .. ..... | 3·83 |

# MARCH, 1884.

| Div. | | STATIONS. [The Roman numerals denote the division of the Annual Tables to which each station belongs.] | RAINFALL. Total Fall. | Difference from average 1870–9 | Greatest Fall in 24 hours. Dpth | Greatest Fall in 24 hours. Date. | Days on which ·01 or more fell. | TEMPERATURE. Max. Deg. | Max. Date | Min. Deg | Min. Date. | No. of Nights below 32° In shade | No. of Nights below 32° On grass |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | inches | inches. | in. | | | | | | | | |
| I. | ENGLAND. | London (Camden Square) ... | 1·40 | — ·21 | ·56 | 10 | 7 | 68·0 | 16 | 27·5 | 1 | 4 | 10 |
| II. | | Maidstone (Hunton Court)... | 1·41 | — ·17 | ·63 | 10 | 11 | ... | ... | ... | ... | ... | ... |
| ,, | | Strathfield Turgiss ..... | 1·58 | + ·18 | ·59 | 3 | 9 | 67·4 | 16 | 25·3 | 3 | 9 | 12 |
| III. | | Hitchin ..... | 1·18 | — ·30 | ·45 | 3 | 7 | 63·0 | 17 | 26·0 | 2 | 11 | ... |
| ,, | | Banbury ..... | 1·76 | + ·16 | ·63 | 3 | 10 | 64·0 | 16*a* | 26·0 | 3 | 11 | ... |
| IV. | | Bury St. Edmunds (Culford) | ·95 | — ·61 | ·33 | 10 | 10 | 66·0 | 17 | 25·0 | 27 | 10 | ... |
| ,, | | Norwich (Cossey) ..... | 1·31 | — ·38 | ·35 | 10 | 13 | 69·0 | 16 | 25·5 | 1, 28 | 9 | 11 |
| V. | | Weymouth(LangtonHerring) | 2·69 | ... | 1·35 | 3 | 12 | ... | ... | ... | ... | ... | ... |
| ,, | | Barnstaple..... | 3·65 | + 1·16 | ·74 | 3 | 18 | 65·5 | 16 | 33·0 | 24 | 0 | ... |
| ,, | | Bodmin ..... | 5·07 | + 1·91 | 1·29 | 3 | 16 | 58·0 | 15*b* | 32·0 | 11 | 1 | 8 |
| VI. | | Cirencester ..... | 2·46 | + ·39 | ·91 | 3 | 17 | .. | ... | ... | ... | ... | ... |
| ,, | | ChurchStretton(Woolstaston) | 3·15 | + ·99 | ·75 | 4 | 19 | 64·0 | 16 | 30·0 | 26 | 9 | 13 |
| ,, | | Tenbury (Orleton) ..... | 2·86 | + ·99 | ·69 | 3 | 15 | 66·7 | 16 | 26·0 | 3 | 11 | 13 |
| VII. | | Leicester ... ..... | 1·62 | ... | ·50 | 3 | 11 | 69·3 | 16 | 28·8 | 24 | 4 | 22 |
| ,, | | Boston ..... | 1·10 | — ·19 | ·43 | 2 | 11 | 68·0 | 16 | 30·0 | 1 | 4 | ... |
| ,, | | Grimsby (Killingholme)..... | 1·39 | — ·27 | ·28 | 4 | 14 | 63·5 | 17 | 31·0 | 1,3 | 2 | ... |
| ,, | | Hesley Hall [Tickhill]..... | 1·46 | ... | ·42 | 3 | 9 | 69·0 | 16 | 24·0 | 1 | 10 | ... |
| VIII. | | Manchester (Ardwick)..... | 2·22 | — ·23 | ·61 | 4 | 12 | 64·0 | 16*a* | 30·0 | 2 | 3 | ... |
| IX. | | Wetherby (Ribston Hall) ... | 1·93 | — ·20 | ·74 | 5 | 7 | ... | ... | ... | ... | ... | ... |
| ,, | | Skipton (Arncliffe) ..... | 4·07 | — ·69 | 1·02 | 4 | 17 | 66·0 | 17 | 29·0 | 1, 21 | ... | ... |
| X. | | North Shields ..... | 2·34 | + ·89 | ·89 | 4 | 12 | 63·5 | 17 | 27·8 | 3 | 7 | 9 |
| ,, | | Borrowdale (Seathwaite)..... | 13·98 | + 4·09 | 3·27 | 14 | 20 | 66·0 | 16 | 28·6 | 11 | 5 | ... |
| XI. | WALES. | Cardiff (Ely)..... | 3·87 | + 1·18 | 1·41 | 3 | 17 | ... | ... | ... | ... | ... | ... |
| ,, | | Haverfordwest ..... | 5·08 | + 1·89 | ·91 | 2 | 18 | 59·5 | 16 | 27·5 | 23 | 5 | 10 |
| ,, | | Plinlimmon (Cwmsymlog) ... | 3·31 | ... | ·60 | 10 | 13 | ... | ... | ... | ... | ... | ... |
| ,, | | Llandudno..... | 2·12 | + ·24 | ·71 | 4 | 12 | 67·5 | 16 | 30·0 | 11 | ... | ... |
| XII. | SCOTLAND. | Cargen [Dumfries] ..... | 4·19 | + 1·41 | ·84 | 14 | 18 | 63·4 | 16 | 27·4 | 11 | 5 | ... |
| ,, | | Hawick ..... .. .. . ..... | ... | ... | ... | ... | ... | ... | ... | .. | ... | ... | ... |
| XIV. | | Douglas Castle (Newmains) | 3·18 | + ·04 | ·59 | 9 | 17 | ... | ... | ... | ... | ... | ... |
| XV. | | Lochgilphead (Kilmory)..... | 4·97 | + ·36 | ·83 | 19 | 24 | 54·0 | 17 | 27·0 | 9, 10 | 12 | ... |
| ,, | | Oban (Craigvarren) ..... | 4·36 | ... | ·59 | 6 | 21 | 62·0 | 16*a* | 30·5 | 1 | 1 | ... |
| ,, | | Mull (Quinish)..... | 5·98 | ... | 1·01 | 6 | 23 | ... | ... | ... | .. | ... | ... |
| XVI. | | Loch Leven Sluices ..... | 2·60 | + ·48 | ·50 | 10 | 11 | ... | ... | ... | ... | ... | ... |
| ,, | | Arbroath ..... | 2·88 | + 1·25 | ·55 | 9 | 15 | 53·0 | 17 | 30·0 | 11 | 5 | ... |
| XVII. | | Braemar ..... .. | 5·88 | + 3·69 | 1·16 | 10 | 18 | 59·4 | 16 | 24·0 | 10 | 14 | 27 |
| ,, | | Aberdeen ..... ..... | 3·40 | ... | ·74 | 8 | 21 | 57·0 | 17 | 31·0 | 10*c* | 4 | ... |
| XVIII | | Skye (Sligachan) ..... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | .. |
| ,, | | Culloden ..... ..... | 1·36 | — ·39 | ... | ... | ... | 63·0 | 16 | 30·5 | 3, 27 | 8 | 22 |
| XIX. | | Dunrobin ..... | 1·80 | ... | ·43 | 9 | 12 | 58·5 | 16 | 29·0 | 10 | 8 | ... |
| ,, | | Orkney (Sandwick)..... .. | 3·63 | + ·99 | ·53 | 8 | 15 | 55·8 | 17 | 29·2 | 11 | 1 | 9 |
| XX. | IRELAND. | Cork (Blackrock) ..... | 5·13 | + 2·37 | ·59 | 10 | 20 | 61·0 | 23 | 29·0 | 7*d* | 4 | .. |
| ,, | | Dromore Castle ..... | 7·10 | ... | 1·70 | 6 | 22 | 60·0 | 14 | 32·0 | 29 | ... | ... |
| ,, | | Waterford (Brook Lodge) ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... |
| ,, | | Killaloe ..... | 4·34 | ... | ·87 | 6 | 21 | 59·0 | 16 | 23·0 | 10 | 6 | ... |
| XXI. | | Portarlington ..... ..... | 1·20 | — ·96 | ·32 | 2 | 23 | 59·5 | 16 | 29·5 | 10 | 5 | ... |
| ,, | | Dublin (FitzWilliam Square) | 1·86 | + ·13 | ·47 | 9 | 17 | 61·1 | 16 | 31·2 | 11 | 1 | 6 |
| XXII. | | Ballinasloe ..... ..... | 3·35 | + ·97 | ·53 | 6 | 22 | 55·0 | 17 | 27·0 | 30 | 7 | ... |
| XXIII | | Waringstown ..... | 2·53 | + ·47 | ·42 | 30 | 17 | 63·0 | 16 | 25·0 | 10 | 5 | 10 |
| ,, | | Londonderry (Creggan Res.). | 2·48 | ... | ·34 | 30 | 21 | ... | ... | ... | ... | ... | ... |
| ,, | | Omagh (Edenfel) ..... | 2·79 | + ·70 | ·41 | 2 | 24 | 61·0 | 16 | 28·0 | 10 | 5 | ... |

+ Shows that the fall was above the average ; — that it was below it.
*a* And 17. *b* And 16, 22. *c* And 21. *d* And 8, 9, 10.

# METEOROLOGICAL NOTES ON MARCH.

ABBREVIATIONS.—Bar. for Barometer; Ther. for Thermometer; Max. for Maximum; Min for Minimum; T for Thunder; L for Lightning; T S for Thunderstorm; R for Rain; H for Hail; S for Snow.

## ENGLAND.

STRATHFIELD TURGISS.- A very favourable month for tillage operations; salutary cold winds dried the clay fallows, and if the weather was less genial it was decidedly more seasonable; lambing season very favourable. Blackthorn in flower on 3rd, horse chestnut in leaf on 22nd, peacock butterfly seen on 5th, tadpoles on 15th.

BANBURY.—Mean temp. 42°·7, a little above the average; high wind on 21st and 31st; fog on 12th and 25th; lunar rainbow at 8.20 p.m. on 12th.

CULFORD.—A remarkably dry and fine month; R much wanted, pheasants commenced laying, and fruit trees looked very promising at the close of the month.

LANGTON HERRING.—From 10th to 30th the weather was very fine: farmers could not have had a more favourable season for ploughing, spring sowing, &c.; mean temp. above the average; solar halos were seen on 5 days; fog on 18th and 19th.

BODMIN.—A singularly mild March; we have literally had no winter. A heavy but brief gale with torrents of R occurred on the 31st, lasting from 6 p.m. to midnight.

WOOLSTASTON.—The first and last weeks of the month were very cold with easterly winds; the middle of the month was warm and genial; mean temp. 41°·9; S fell on 2nd; a strong gale occurred on the night of the 31st.

ORLETON.—The temp. was low till the 12th, with frost almost every night; S fell on 1st and 3rd, and heavy R on 3rd and 4th; it then became warmer, and continued so till the 24th with fine days and much sunshine; the remainder of the month was cloudy, cold, and sunless, with N.E. wind. The mean temp. of the month was 1°·3 above the average of 23 years; apricots and peaches blossomed about the 19th, and damson trees about the 23rd.

LEICESTER.—A dry month, at times warm for the season; R was needed at the close both for the fields and gardens, but in both the prospect was promising.

KILLINGHOLME.—The month opened with cold weather, but there were some very fine days in the middle; the latter part was cool and dry, and R was wanted at the close.

ARDWICK.—March was on the whole a fine open month, E. wind prevailed for some time, but was not so cold as on other occasions; vegetation is very forward, and we shall this year have a green Easter.

## WALES.

HAVERFORDWEST.—The month as a whole was unusually wet; it commenced cold, stormy and very wet, and some of the heaviest floods of the winter occurred during the first three days. A cold, easterly blast prevailed from the 28th to the end of the month, drying up all the moisture in an almost miraculous manner, and the sudden fall of temp. which accompanied it caused much sickness.

LLANDUDNO.—The weather generally was fine and seasonable; up to the 10th it rained more or less on every day but two; from the 10th till within two days of the close of the month the weather was generally dry and most favourable for agricultural operations; mean temp. nearly 1°·5 above the average; mean daily range slightly below, and total range considerably above the average.

## SCOTLAND.

CARGEN.—A very dull month, only 68 hours of sunshine, the average being 135 hours; it was very wet up to the 20th, and farming operations were much

impeded in consequence ; mean temp. 1°·1 above the average ; S on 3rd ; gale on 20th.

OBAN.—The month on the whole was very fair ; the temp. increased rapidly from 5th to 17th, and on the latter day occurred the highest reading known in March for many years ; thereafter easterly winds set in, and normal weather prevailed to the close of the month. S on 4 days ; H on 3 days ; heavy gale with T and H on 19th.

ABERDEEN.—Rainfall greatly above the average for the month ; strong gales occurred from various directions with heavy showers, giving an unsettled character to the weather till the 23rd, after which date dry weather prevailed for about a week ; but strong S.E. winds, again accompanied by heavy R, blew on 30th and 31st ; aurora on 28th ; and L on 18th.

SANDWICK.—The temp. of the month was mild, but there were gales of 50 miles an hour on the 8th, 9th, 19th and 20th, and one of 60 miles an hour on 10th. The ground was white with S on 10th, and snow rollers were formed on 12th.

## IRELAND.

BLACKROCK.—During the month there were few days without R, and the winds were very variable.

KILLALOE.—R fell on very many days for March, with very cold S.E. winds, and not a particle of March dust was visible ; agriculture, therefore, was tedious and late ; S on 9th, 10th, and 11th.

DUBLIN, FITZWILLIAM SQUARE.—The weather was generally favourable, and an exceptionally dry period lasted from the 13th to 31st, the rainfall not amounting to one-tenth of an inch. Unusual warmth for the time of the year prevailed between the 14th and 19th ; the mean temp. of the month, 44°·9, was about 2° above the average of twenty years ; sleet or S occurred on 10th and 31st, H on 20th and 31st, fog on 4th and 24th ; the wind blew freshly or strongly on 12 days.

BALLINASLOE.—The month was wet and rough, but not so cold as usual, and there was little E. wind ; a heavy fall of S occurred between 11 p.m. on 30th, and 6 a.m. on 31st.

EDENFEL.—Another very mild month, but 24 days with R, and no drying winds, resulted in a most backward seed-time ; the mean temp. on the 16th, 55°, is higher than that of any other day in March for more than 20 years.

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## ERRATA IN METEOROLOGICAL MAGAZINE, 1883.

We are glad to be able to state that up to the present time the following are all the errata detected by comparing the annual summaries for 1883 with the records as published monthly. There are twelve errors, and as there are about 3,000 entries in the tables, this gives about one wrong entry to 249 right ones. This, though better than last year, is still below the accuracy which is reached in the annual volume of *British Rainfall*.

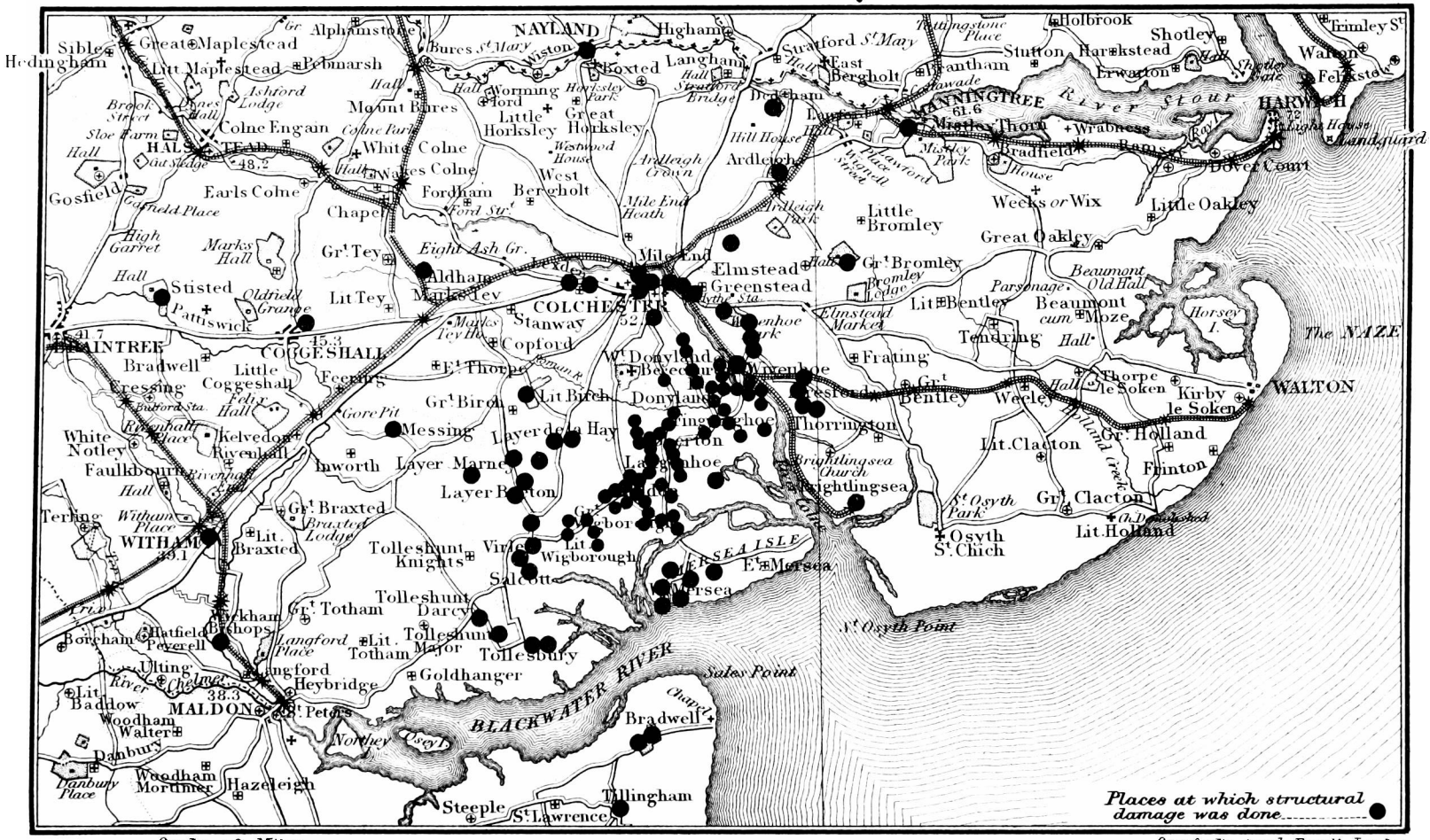
### REGULAR TABLE.

| | in. | | in. |
|---|---|---|---|
| Bodmin, July, should be ..... | 5·01 | Haverfordwest, Aug., should be | 2·36 |
| Haverfordwest, max. fall, April | ·85 | Newmains, December ..... | 5·25 |

### SUPPLEMENTARY TABLE.

| | in. | | in. |
|---|---|---|---|
| Beaminster, July, should be..... | 3·57 | Mickleton, Jan., should be..... | 8·93 |
| Coundon, August ..... | 1·06 | ,, April ..... | 2·19 |
| ,, September ..... | 5·51 | Mullingar, Belvedere, Feb..... | 3·83 |
| Macclesfield, August ..... | 2·78 | ,, ,, Sept. ... | 4·39 |

# SITES OF STRUCTURAL DAMAGE BY EARTHQUAKE OF APRIL 22ND 1884.



# GENERAL MAP OF AREA OVER WHICH THE EARTHQUAKE OF APRIL 22ND 1884 WAS FELT.