

# SCOTTISH METEOROLOGICAL SOCIETY.

Observations taken at The Lakeside, Clonmel, Co. Wick, County of Wick, in Lat. 53° 17', Long. 10° 17', Distance from Sea 17 miles.  
Height of Cistern of the Barometer above Mean Sea-level 280 feet, above Ground        feet.  
During the MONTH of January 1878  
The Hours of Observation are of Greenwich Time.

ELECTRICITY.	Days of Month.	BAROMETER.				SELF-REGISTERING THERMOMETERS.				HYGROMETER.				WIND.				RAIN.		CLOUDS.				THERMOMETERS under Ground.				SEA.	OZONE.	GENERAL REMARKS.	Days of Month.									
		9 h. A.M.		9 h. P.M.		Protected in Shade, 4 feet above Ground.		Exposed Black Bulbs.		9 h. A.M.		9 h. P.M.		9 h. A.M.		9 h. P.M.		Readings of the H.Cup Anemometer.		9 A.M.		P.M.		9 h. A.M.		9 A.M.						P.M.								
		Barometer.	Atmospheric Thermometer.	Barometer.	Atmospheric Thermometer.	Max.	Min.	Max.	Min.	Dry bulb.	Wet bulb.	Dry bulb.	Wet bulb.	Direction.	Force.	Direction.	Force.	No. of hours in which it fell.	Amount in inches.	Velocity (0-6) and Direction.	Amount (0-10) and Species.	Velocity (0-6) and Direction.	Amount (0-10) and Species.	No.	3 inches.	12 inches.	22 inches.					No.	3 inches.	12 inches.	22 inches.					
		* No.	No.	No.	No.	No.	No.	No.	No.	No.	No.	No.	No.	No.	No.	No.	No.	No.	No.	No.	No.	No.	No.	No.	No.	No.	No.					No.	No.	No.	No.	No.	No.			
		inches.	°	inches.	°																																			
	1	29.900	40	29.875	39	40	28			35	33	40	36	SW	SW						Cu	Cu											Partly	1						
	2	29.550	40	29.600	48	48	35			51	48	48	46	SW	SW			0.02			Cu	Si										Changeable	2							
	3	29.850	43	29.950	46	48	30			37	37	36	35	S	SW						Si	Si										Fine	3							
	4	29.750	41	29.850	48	45	29			35	34	35	34	SW	SW						Cu	Cu										Fine	4							
	5	29.500	42	29.100	48	49	27			36	34	26	33	S	SW						Cu											Fine	5							
	6	29.775	41	29.067	41	43	27			34	33	36	33	S	SW						Cu	Si										Fine	6							
	7	29.762	41	29.564	42	37	27			34	33	38	37	S	SW						Cu	Cu										Partly and slight showers	7							
	8	30.016	41	30.086	42	38	35			35	33	35	34	NO	NO						Cu	Cu										overcast	8							
	9	30.014	40	29.964	42	36	30			37	36	35	33	NO	NO						Cu	Cu										overcast and cold slight frost	9							
	10	30.014	40	30.122	43	39	29			35	33	35	34	NO	NO						Cu	Cu										Partly and overcast	10							
	11	30.169	40	30.197	33	35	28			37		29		S	S						Cu	Cu										Partly throughout	11							
	12	30.157	39	29.817	39	41	19			36		41	39	NO	S						Cu	Cu										Partly throughout	12							
	13	29.817	42	29.767	41	43	30			37	26	40	37	S	S						Cu	Cu										Partly	13							
	14	29.699	44	29.869	44	43	31			44	41	35	35	NO	NO			0.05			Cu	Cu										overcast & light showers	14							
	15	29.759	44	29.554	44	46	30			37	37	47	46	S	S			0.21			Si	Si										showers	15							
	16	29.546	47	29.801	46	51	43			47	46	43	43	NO	NO						Cu	Cu										Fine	16							
	17	29.953	46	30.106	45	42	25			39	37	35		SW	SW						Cu	Cu										Fine	17							
	18	29.964	38	30.066	47	42	22			36		42		S	SW						Cu	Cu										Fine	18							
	19	29.956	41	29.706	45	45	35			39	38	45	44	NO	NO						Cu	Cu										Changeable and fine P.M.	19							
	20	29.612	43	29.335	46	47	35			40	39	45	41	NO	NO			0.01			Cu	Si										Changeable	20							
	21	29.157	47	29.349	48	50	29			40	36	35	32	NO	NO						Si	Si										overcast blowing a gale at night	21							
	22	29.580	36	29.115	42	36	24			38		35	32	S	SW						Cu	Cu										overcast	22							
	23	29.797	42	29.720	40	38	29			32	31	36	34	S	S						Cu	Cu										ground slightly covered with snow and frost	23							
	24	29.765	42	29.990	42	36	23			38		34	35	NO	NO						Cu	Cu										Partly and blowing a gale	24							
	25	29.965	42	29.365	42	38	18			36		36	35	NO	NO			0.22			Cu	Cu										blowing a gale and heavy cold snow	25							
	26	29.612	43	29.670	40	38	22			37	36	35	34	NO	NO			0.03			Cu	Si										Partly and fine	26							
	27	29.559	42	29.312	43	38	20			38	35	35	35	SW	SW			0.42			Si	Si										overcast and foggy, with sleet showers P.M. and blowing a gale	27							
	28	29.715	42	29.410	39	38	23			36		37		SW	SW						Cu	Si											Fine and an frost	28						
	29	29.640	40	29.874	38	38	19			34		37		SW	SW						Cu	Cu											Partly and fine	29						
	30	29.445	40	30.170	38	38	17			27		31		SW	SW						Cu	Cu											Partly severe	30						
	31	30.227	36	30.264	39	36	14			23		36	33	S	S						Cu	Cu											And do do	31						
	Sums.	19	51	20.3	5	4	20.4			16	13	19	151					0.96															NOTATION USED IN GENERAL REMARKS.							
	Means.	29.637	40.6	29.655	41.7	41.3	26.6			38.0	36.5	38.3	36.6																				a. denotes aurora.							
	† Total Corrections for Instrumental Errors.																																	m. denotes meteor.						
	† Corrections for Diurnal Range.																																	ms. " meteors.						
	"Corrected Means."																																	n. " nimbus.						
	No. of Column.	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30		r. " rain.							
																																		h. r. " heavy rain.						
																																		c. h. r. " continued heavy rain.						
																																		s. " stratus.						
																																		d. " dew.						
																																		f. " fog.						
																																		fr. " frost.						
																																		h. fr. " hoar-frost.						
																																		so. ha. " solar halo.						
																																		h. d. " haze.						
																																		h. l. " heavy dew.						
																																		hl. " hail.						
																																		l. " lightning.						
																																		li. cl. " light clouds.						
																																		li. sh. " light showers.						
																																		lu. co. " lunar corona.						
																																		lu. ha. " lunar halo.		g. " gale of wind.				
																																		TABLE FOR ESTIMATING FORCE OF WIND.						
																																		Estimated Force, 0-6.	Common Designation.	Estimated Force, 0-6.	Common Designation.	Estimated Force, 0-6.	Common Designation.	
																																		0 " Calm	1-5 " Very light air	1-5 " Light breeze	4 " Fresh breeze	4 " Very fresh	5 " Blowing hard	
																																		0.5 " Light air	2-3 " Fresh breeze	3-5 " Very fresh	5 " Blowing a gale	5 " Violent gale		

BAROMETER, "corrected Mean" at 9 A.M., minus the Correction†† for Temp. (Col. 2), = 29.602  
"Corrected Mean" of Barometer at 9 P.M., minus the Correction†† for Temp. (Col. 4), = 29.620  
Mean at Station, corrected, and at 32°, = 29.611  
Correction for height, feet above Mean Sea-level, = 31.5  
Mean, reduced to 32°, and Sea-level, = 29.926  
Highest Reading, corrected for Index error, on the th, = 30.269  
Lowest Do. Do., on the th, = 28.765  
Difference, or Monthly Range, = 1.504

S.-R. THERMOMETER, (in shade, etc.), Highest in Month, (corrected for Index Errors), on the 2<sup>nd</sup> th, = 52.6  
Lowest in Month, corrected for Index errors, on the th, = 41.0  
Difference, or Monthly Range, = 11.6  
"Corrected Mean" of all the Highest, (Col. 5), = 40.9  
"Corrected Mean" of all the Lowest, (Col. 6), = 30.6  
Difference, or Mean Daily Range, = 10.3  
\*\* Calculated Mean Temperature of Month, = 38.4  
S.-R. THERMOMETER, Black Bulb in Sun, Highest, (corrected for Index Errors), on the th, =         
"Corrected Mean," (Col. 7), of Black Bulb, Max. in Sun, =         
Lowest at Night, Black Bulb, (corrected for Index errors), on the th, =         
"Corrected Mean," (Col. 8), of Black Bulb, Min. on grass, =         
Difference of above Means or Range ("exposed"), =       

HYGROMETER, Mean (corrected) A.M. and P.M. Reading of Dry Bulb, (Cols. 9 and 11), = 38.4 36.0  
Mean (corrected) A.M. and P.M. Reading of Wet Bulb, (Cols. 10 and 12), = 36.5 34.4  
†† Computed Temperature of Dew-Point, = 34.4 32.0  
†† Do. Elastic Force of Vapour, = 499 182  
†† Do. Weight of Vapour in a Cubic Foot of Air, =         
†† Relative Humidity, (Saturation = 100), = 82 86  
RAIN fell on 7 Days; Amount in Inches, = 0.96

Direction.	SUMMARY.										Mean Force.	Mean Velocity in miles per day.
	N	NE	E	SE	S	SW	W	NW	Calm or Variable.			
A.M.	1	0	0	2	1	4	1	1	0			
P.M.	1	0	0	3	8	8	0	2	0			
Mean.	1	0	0	3	10	6	0	2	0			

Observations made and Return verified by

(Signed)

M. J. Mac Donnell 74



Channing  
Jan. 4 1878

 $T_0$ 

Mr ALEXANDER BUCHAN

*Secretary of the Meteorological Society of Scotland,*

EDINBURGH.

The minute has been most favorable for the children  
of the infant school. During the second time  
of the singing of the hymn, which was sung.

Turnips, rutabagas, etc., whether plentiful or in perfection; whether any have suffered from blight, disease, etc. Whether Epizootic diseases prevail among cattle; and the Agricultural condition of the district generally.

SHRUBS, ETC.					
Baberry,					
Bourree or Elder,					
Broom,					
Hazel,					
Hawberry,					
Holly,					
Laburnum,					
Lilac,					
Mazzeoon,					
Mountain ash or Rowan,					
Red flowering Currant,					
Rhododendron Ponticum,					
Whin,					
FRUITES.					
Apple,					
Black Currant,					
Cherry,					
Gean,					
Gosberry,					
Teach,					
Pear,					
Pinn,					
Strawberry,					
MIGRATORY BIRDS.					
Cuckoo,					
Curlew,					
House-Swallow,					
Lapwing,					
Sand-Martin,					
Starling,					
Swan,					
Kill or Corn Crane,					
DEPARTURE.					

OBSERVATIONS IN CONNECTION WITH THE PERIODICAL RETURN OF THE SEASONS.

EDINBURGH, December 18<sup>th</sup> 44.

Thermometers usually, but not necessarily, mounted on a pole. The *Dry and Wet-Bulb Hygrometer* is the approved form of this apparatus seriously trusted by the Hygrometrical Observers. Observers are especially requested to attend to the following conditions:—The bulbs must hang down from the top of the pole at least an inch free from the scales and frame to which they are attached; the frame must be such as will bring the tubes and bulb into a vertical position, and must be so constructed, that the bulb is at least an inch from any board on which it is placed; the bulb must be of medium fineness, and fastened at the neck of the bulb by the cotton, which also supplies it with water. The bulb must be seen by the Observer that the machine is always clean and moist, and the water pure. In frosty weather, great care. The bulb must be moistened by immersion from 15 to 30 minutes before the hour of observation. From the film of ice thus formed evaporation will proceed as from the moist globe in ordinary circumstances. In reading the Thermometer great care the tip of the index bringing the eye exactly, and the reading ought to be taken to tenths of a degree, and noted in decimals. Thus the Thermometer will be read  $-38\cdot9$ ,  $40\cdot0$ , or  $40\cdot1$ ; or again,  $40\cdot0$ ,  $40\cdot4$ , or  $40\cdot6$ , according as it indicates a little under, and, so also  $40\cdot1$ , and  $40\cdot2$ , or a little over  $40\cdot0$ , or  $40\cdot3$ , respectively. In reading Rutherford's Minimum Thermometer, the indication of that end of the index which is next the surface of the spirit is alone noted. On opening the Thermometer Box, the Dry and Wet Bulb Hygrometer must be first, and rapidly, read, inasmuch as they are really affected by the hygrometrical changes.

The Hygrometers are read at 9 A.M. and 9 P.M. The Self-Registering Thermometers are read at 9 P.M. only, as indicating the hour of observing the greatest and least degrees of temperature in the 24 hours preceding. It is not a matter of indifference when the Self-Registering Thermometers are read, since, in winter at least, the extremes may occur at any hour; and it is necessary to refer their occurrence to their proper meteorological day. In the Society's schedules, the indications registered on the 3d and 6th of a series of phenomena commencing at 9 P.M. on the 2d, and extending till 9 P.M. on the 3d, are used for Meteorological purposes till the instrument ought to be read, tested by comparison with the Standard Thermometer. When such Thermometers as are not graduated on the stem, but merely on an attached scale, undergo repairs, they are very liable to be moved from their position on the Scale, and ought never afterwards to be used without being re-tested. The Self-Registering, especially the Minimum Thermometers, ought frequently to be compared with the dry bulb of the Hygrometer. The freezing-point of each thermometer, marked by a scratch on the tube, ought to be tested once a year, in snow or melting ice.

In selecting instruments, the following points require attention:—In selecting instruments, the following points require attention:—

be put behind the tube. It is not so mixing any thing as the thermometer, and exposed to neither the sun's direct rays nor the shade. The thermometer must not be hung against a wall, but in the air. The object being to secure that the instrument will be exposed, including the brass fittings, the glass, the ivory, and the attached Thermometer, shall be in the air, and at one uniform temperature, it is evident that the best position for it is that which is least liable to sudden changes of temperature.

In taking an Observation, the Attached Thermometer is first noted: the tube must then be gently tapped, and the cistern-adjustment carefully made. The eye, by raising and lowering it, must be brought into the plane of the back and front of the index, usually by the lower edge of the vernier, which must be carefully adjusted so as to form exactly a tangent to the convex surface, so as to prevent heat from the observers' hands and feet from affecting the mercury. The use of a glass with a white interior is very useful to prevent the use of the eye from being fatigued.

A mistake not infrequently made by those beginners who observe, consisting in setting the edge of the vernier to the level of the glass surface of the mercury which is in direct contact with the glass tube, must be carefully avoided.

The errors most frequently made in reading the Barometer are errors of 1/1000 inch, 0/500 inch, and 0/250 inch; that is to say, instead of 29/365 inches, after the following is sometimes said, 29/365 inches, viz: as 30/365 inches, 28/365 inches, 29/365 inches, &c. &c. make these mistakes, particular attention must be paid to the manner in which the instrument is read.

When a Barometer, having all the parts adjusted, has to be removed from its stand, it is always to be removed first as to form, and then to tighten the cistern, thus preventing the escape of the mercury. Upon turning up the mercury not quite to the top of the tube, but to within a quarter of an inch of it, and take down the instrument; it should then be carried with the cistern upmost. Before suspending the Barometer for use, it must be ascertained whether the space above the mercury in the tube is a complete vacuum; this is the case if, on inclining the instrument, a sharp tap is produced when the mercury strikes the top of the tube. If a dull tap is heard, there is air in the tube, which must be got rid of, by the introduction of air. As Barometers are liable to be got out of place, or in being carried into other times, on being taken down from places to place, or in being roughly handled. First, cleanse up the cistern, by screwing the ivory key tight, so as to prevent the escape of mercury; then screw up the mercury to about half an inch from the top of the tube; and having slowly introduced the instrument, place the top of it on a yielding substance, such as the boot, and gently tap on the cistern with the palm of the hand, so as to induce the air to ascend through the column to the cistern, whence it may escape. Should there be the weight of two atmospheres—the pressure on any air that may be in the Barometer, and the air outside, belows operation to get it wholly expelled. After repeated cleansing, however, is generally accomplished. After the top of the glass tube, will allow when the whole of the air has been expelled. On hanging up the Barometer, care must be taken to screw down the mercury in the tube before using the



# SCOTTISH METEOROLOGICAL SOCIETY.

Observations taken at Highland, Co. Highland, County of Highland, in Lat. 57° 40' N., Long. 8° 15' W., Distance from Sea 187 miles.  
 Height of Cistern of the Barometer above Mean Sea-level 100 feet, above Ground 100 feet.  
 During the MONTH of January 1878.  
 The Hours of Observation are of Greenwich Time.

ELECTRICITY.	Days of Month.	BAROMETER.				SELF-REGISTERING THERMOMETERS. Read Daily, at 9 P.M.				HYGROMETER. No. —				WIND.				RAIN.		CLOUDS.				THERMOMETERS under Ground.				SEA.	OZONE.	GENERAL REMARKS.  As to occurrence of Thunder, Lightning, Storms, Hail, Meteors, Remarkable Depression or Elevation of Barometer, Prevalent Diseases, etc.  Mention the hour at which Storms, including Thunder and Lightning, begin and end.	Days of Month.																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																													
		9 h. A.M.		9 h. P.M.		Protected in Shade, 4 feet above Ground.		Exposed Black Bulbs.		9 h. A.M.		9 h. P.M.		9 h. A.M.		9 h. P.M.		Readings of the H. Cup Anemometer. No. —	No. of hours in which it fell.	Amount in inches.	9 A.M.		P.M.		9 h. A.M.																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																			
		Barometer. * No. —	Attach- ed Ther- mometer	Barometer. No. —	Attach- ed Ther- mometer	Max. No. —	Min. No. —	Max. in Sun's rays No. —	Min. on Grass. No. —	Dry bulb.	Wet bulb.	Dry bulb.	Wet bulb.	Direc- tion.	Force	Direc- tion.	Force				Velocity (0—5), and Direction.	Amount (0—10), and Species.	Velocity (0—5), and Direction.	Amount (0—10), and Species.	No. 3 inches.	12 inches.	No. 22 inches.																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																	
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BAROMETER, "corrected Mean" at 9 A.M., minus the Correction†† = 29.745  
 for Temp. (Col. 2), = 29.786..... - 0.041.....  
 "Corrected Mean" of Barometer at 9 P.M., minus the Correction†† = 29.732  
 for Temp. (Col. 4), = 29.776..... - 0.044.....  
 Mean at Station, corrected, and at 32°,..... = 29.738  
 Correction for height, feet above Mean Sea-level,..... = 312  
 Mean, reduced to 32°, and Sea-level,..... = 30.050  
 Highest Reading, corrected for Index error, on the th,..... = 30.222  
 Lowest Do. Do., on the th,..... = 28.954  
 Difference, or Monthly Range,..... = 1.268

S.-R. THERMOMETER, (in shade, etc.), Highest in Month, (corrected for Index Errors), on the th,..... = 64.6  
 Lowest in Month, corrected for Index errors, on the th,..... = 41.0  
 Difference, or Monthly Range,..... = 23.6  
 "Corrected Mean" of all the Highest, (Col. 5),..... = 47.3  
 "Corrected Mean" of all the Lowest, (Col. 6),..... = 30.6  
 Difference, or Mean Daily Range,..... = 16.7  
 \*\* Calculated Mean Temperature of Month,..... = 39.2  
 S.-R. THERMOMETER, Black Bulb in Sun, Highest, (corrected for Index Errors), on the th,..... =  
 "Corrected Mean," (Col. 7), of Black Bulb, Max. in Sun,..... =  
 Lowest at Night, Black Bulb, (corrected for Index errors), on the th,..... =  
 "Corrected Mean," (Col. 8), of Black Bulb, Min. on grass,..... =  
 Difference of above Means or Range ("exposed"),..... =

HYGROMETER, Mean (corrected) A.M. and P.M. Reading of Dry Bulb, (Cols. 9 and 11),..... = 41.0  
 Mean (corrected) A.M. and P.M. Reading of Wet Bulb, (Cols. 10 and 12),..... = 39.2  
 # Computed Temperature of Dew-Point,..... = 36.9  
 # Do. Elastic Force of Vapour,..... = 2.19  
 # Do. Weight of Vapour in a Cubic Foot of Air, ... =  
 # Relative Humidity, (Saturation = 100),..... = 82  
 RAIN fell on 7 Days; Amount in Inches,..... = 0.08

WIND.		SUMMARY.									
Direction.	N	NE	E	SE	S	SW	W	NW	Calm or Variable.	Mean Force.	Mean Velocity in miles per day.
A.M.	7				20	1					
P.M.	5				20	1					
Mean.	6	0	0	0	20	2	0	0	0		

Observations made and  
 Return verified by {

(Signed) Alfred Donald

7A



The Council recommend that Observations be made precisely 9 a.m. and 9 p.m. (Greenwich or Railway Time only), as specified in the following remarks, or at the top of the columns of the Schedule. It is hoped that the utmost punctuality in the time of reading the instruments will be observed. Observers, in some of our cases, may find this impossible; in such instances, they are specially requested to mark off the time of reading the time at which it was taken. If not at 9 a.m. or 9 p.m., the Weather-Glasses and Aneroid-Bars should be read, and the results of the readings of the barometric pressure, are not finally separating purposes. No Barometer should be used for Meteorological observation that is not supplied with some means of adjustment or compensation which will secure that the height of the mercury in the tube is accurately measured from the horizontal surface of the mercury in the cistern.

[illegible]

As Barometers are liable to be deranged by the introduction of air into their tubes, on removal from place to place, or on being roughly handled, it may be useful to Observers to know how the air may be expelled. First close up the cistern by screwing the ivory stopper tight so as to prevent the escape of mercury; then screw up the ivory stopper to about half an inch from the top of the tube; and having slowly inverted the instrument, place the top of it on a yielding substance, such as the foot, and gently tap on the cistern with the palm of the hand, so as to induce the air to ascend through the column to the cistern, whence it may escape. Since there is the weight of two atmospheres—*the pressure on any air that may be in the tube, and the air outside—*pressing on any air that may be inside the tube, it is usually a tedious operation to get it wholly expelled. After repeated trials, however, it is generally accomplished, and the clear metallic sound of the mercury, when gently struck against the top of the glass tube, will show when the whole of the air has been expelled. On banging up the Barometer, care must be taken to screw down the mercury in the tube before unscrewing the foot of the cistern, for if this be not attended to, the mercury will run out, and the instrument be seriously damaged.

Professor Phillips's, and Negretti and Zambra's Maximum Thermometers, and Rutherford's Minimum Thermometer are recommended. It is recommended that these Thermometers be graduated on the glass stem. The minimum Thermometer is liable to two dangers;—viz., the action of spirit breaking, and part of the spirit disilling by high pressure and bulging at the top of the tube. This disengagement of occasional occurrence with Protected Thermometers, but of frequent occurrence with Exposed Thermometers. Hence a systematic examination of Minimum Thermometers ought to be a regular part of the work carried by each Observer.

The bulbs of the Thermometers for registering the greatest heat from the sun's rays, and the least from radiation during night, have a black coating, which may easily be made, or mounted, by the application of a mixture of lamp black and printers' ink. They are placed in shallow blackened boxes, whose sides protect the bulbs from the wind, and the thermometer stems and the bulb of the thermometer should rest on wooden supports, a few inches from the edge of the grass, in an open situation. Snow must not be allowed to cover either of these Thermometers; nor the sun's heat reflect the Minimum Thermometer by distillation. Black-balls suspended in "glass jacks", may also be used, being indelible preferable to the above. It must, however, be added, that the whole subject of the observation of Solar and Terrestrial Radiation is not yet in sufficiently advanced state to warrant the exclusive recommendation of any one of these methods.

The Thermometer in use at the Society's Stations consists of two Thermometers usually, but not necessarily, mounted on one frame. As apparently slight deviations from

The Hygrometer is read at 9 A.M. and 9 P.M. The Self-Registering Thermometers are read at 9 P.M. only, as indicating the greatest and least degrees of temperature in the 24 hours preceding. It is not a matter of indifference to the Self-Registering Thermometers are read, since, in winter at least, the extremes may occur at any hour; and it is necessary that they register for their proper meteorological day. In the winter of their scales, the indications registered on the 31<sup>st</sup> of one month are placed on the 1<sup>st</sup> of the next, so that the reading will be 9 P.M. on the 31<sup>st</sup> of one month, and 9 P.M. on the 1<sup>st</sup> of the next.

No instrument ought to be used for Meteorological purposes till it has been carefully tested by comparison with a Standard Thermometer. When such comparison with a Standard Thermometer is made, the thermometer is not graduated on the stem, but merely on a graduated scale, undergo repairs, they are very liable to be moved from their position on the Scale, and ought never afterwards to be used without being re-tested. The Self-Registering, especially the Standard Thermometers, ought frequently to be compared with a Standard Thermometer. The freezing-point of each thermometer, marked by a scratch on the tube, ought to be tested once in a while.

In selecting instruments, the following points require attention:—

1. That the instruments be of the best quality, and that the divisions of the venier of Barometers be referred to their scales.

2. That the instruments be of the best construction, and that the perfect freedom of the Barometer from air; the largest num-

A Wind-Vane ought to be elevated at least 12 feet above surrounding objects. When it oscillates, inevitably the

a system of simultaneous observation, pursued at different Stations, is likely to give highly valuable and important results, particularly in connection with the system of thickly-planted Stations over a limited district round Edinburgh called *SPORA STATIONS*, in the course of being established by the Society for the systematic investigation of the relation of the force of the wind to *BAROMETRIC GRADIENTS*, and other points connected with storms.

Many causes conspire to produce anomalies in Rain Returns, arising partly from the difficulty of obtaining a perfectly unobjectionable situation for observation, and partly from the defective nature of the instruments used. The Rain-Gauge should not be placed on a slope or ridge, but

term of the Gauge must be perfectly level, and fixed, that it will always be at the same height above the ground, and level in all weathers, and be at a height of one foot above the ground, over grass. In such Gauges as Flemish's, which are furnished with a measuring rod attached to a float, the rod ought to be fixed to the float, and the float rise to its height only at the time the instrument is read, and then projecting the topmost of the Rain Gauge, which is usually marked with the name of the Gauge, and the name of the place, and the name of the person who is to read it, should be taken to hold the float up to the top of the Gauge. The Rain Gauge to be read daily at 9 A.M. and the reading entered in the Remarks of the previous day. If the Gauge is read once a month, the reading is to be made on the first of the month, and the amount entered for the previous month. Show falls may, for convenience, be registered in the 10 columns.

Conventional abbreviations for the nomenclature of Clouds will not be found on the other side. The amount of Clouds ought to be estimated from the greater or less observation of the sky overcast (*i.e.*, within  $20^{\circ}$  or  $30^{\circ}$  of the zenith). The strata of Clouds that appear near the horizon are viewed obliquely; and thus, being unable to judge of their amount, we ought not to take them into account in the Clouds' column, though their appearance and changes may be necessary to be noted.

Clouds are divided into six orders, 0 to 10; thus, when the sky overcast is free from Clouds it is entered 0, when half covered by Clouds, 5, and wholly covered, 10, and so on.

Cloud column, an entry of  $\frac{2}{9}$  cent., will indicate that the higher regions are covered to the amount of 4-tenths with stratus Clouds ; and that the sky is further obscured to the extent of 2-tenths by lower Clouds of the cumulo-stratus kind.

As the germination and growth of crops and plants generally depend greatly on the temperature of the soil,—its amount and constancy,—the Council recommend that Observations in this interesting department be made at 9 a.m. by Thermometers permanently fixed in the soil, their bulbs being sunk to depths of 3, 12, and 22 inches, and the stems above ground protected from the sun's rays, and fitted with sloping tin collars, to prevent rain water being conveyed to the bulbs by the stems or wooden frames.

A knowledge of the Temperature of the Sea is nearly as important in its relations to that of our island, a itself, as that of the Air. The Council therefore recommend that the Temperature of the Sea be carefully taken by a properly constructed apparatus, from boats, or from the shore, at the ends of piers and rocks round the coast, where it is not influenced by that of river water, and as little as possible by the influence of the wind. The observations should be continued as possible by currents sweeping along the coast, and thus affording the temperature of the land, either greatly heated by the sun, or cooled by nocturnal radiation. At or near the mouth of high

**Ozone.** The paper affixed by a pin to a board in the Weather Bureau's standard form of the *Journal* is the Ozone Paper. It is desired that these indications be registered in connection with the force and direction of the wind at the time of observation, in the following manner:—thus 3<sup>35</sup>W, is an Ozone entry on the schedule, will indicate that the Ozone paper is united as 3 on the scale, that the wind is from the N. W., and that its force on the 0—6 is 4, or blowing fresh.

the very advantage of, and a list of its arts in general use are given at the foot of the column. Besides such and extraordinary Observations great prominence ought to be given in this column to Prevalent Diseases, differences in character, colour, velocity, and direction between the Lower and Upper Strata of Clouds; the Colour of the Sky, &c. etc. Remarks ought to be made on the occurrence of Meteors, comets, &c. etc. Remarkable depressions, elevations, and fluctuations of the Barometer, Thunder-Storms, and remarkable falls of Snow, Hail, Rain, the Hoar of Storms of Wind commencing after giving their

Observations in connection with the Periodic Return of the Seasons, possess not only great scientific value, but are of considerable importance in connection with Agriculture, Horticulture, and Natural History. The Council would direct the special attention of Observers to the registration of such phenomena, so that the published Summaries may fairly represent the whole of Scotland.

Булгарин, *December 1874.*

OBSERVATIONS IN CONNECTION WITH THE PERIODICAL RETURN OF THE SEASONS.

[illegible]

Umpires, Farmers, etc., whether present, or in perfection; whether any have suffered from blight, disease, etc. Whether Epizootic disease prevails among cattle; and the Agricultural condition of the district generally.

EDINBURGH, December 1874.

A. B.

Mr ALEXANDER BUCHAN

*Secretary of the Meteorological Society of Scotland*

EDINBURGH.

BOOK POST

A circular postmark from Aberdeen, dated April 6, 1978. The text "ABERDEEN" is curved along the top, "H" is in the center, "APR 6Z" is curved along the bottom, and "78" is at the very bottom.













# SCOTTISH METEOROLOGICAL SOCIETY.

Observations taken at Quincy Court Square, County of Merced, in Lat. \_\_\_\_\_, Long. \_\_\_\_\_, Distance from Sea 17 miles.  
Height of Cistern of the Barometer above Mean Sea-level 280 feet, above Ground \_\_\_\_\_ feet. During the MONTH of April 1878.  
The Hours of Observation are of Greenwich Time.

[illegible]

<b>BAROMETER,</b> "corrected Mean" at 9 A.M., minus the Correction <sup>††</sup>	=	29.533
for Temp. (Col. 2), = 29.584..... - ...051}		
<b>"Corrected Mean" of Barometer at 9 P.M., minus the Correction<sup>††</sup></b>	=	29.552
for Temp. (Col. 4), = 29.605..... - ...053}		
<b>Mean at Station, corrected, and at 32°,.....</b>	=	29.543
<b>Correction for height,</b> feet above Mean Sea-level,.....	=	312
<b>Mean, reduced to 32°, and Sea-level,.....</b>	=	29.855
<b>Highest Reading, corrected for Index error, on the 11 th,.....</b>	=	30.021
<b>Lowest Do. Do., on the 1 th,.....</b>	=	28.242
<b>Difference, or Monthly Range,.....</b>	=	1,569

<b>S.-R. THERMOMETER</b> , (in shade, etc.), <b>Highest in Month</b> , (corrected for Index Errors), on the <u>14</u> th, .....	=	<u>65.0</u>
<b>Lowest in Month</b> , corrected for Index errors, on the <u>2</u> th, .....	=	<u>21.0</u>
Difference, or <b>Monthly Range</b> , .....	=	<u>44.0</u>
"Corrected <b>Mean</b> " of all the <b>Highest</b> , (Col. 5), .....	=	<u>57.7</u>
"Corrected <b>Mean</b> " of all the <b>Lowest</b> , (Col. 6), .....	=	<u>38.7</u>
Difference, or <b>Mean Daily Range</b> , .....	=	<u>18.4</u>
<b>** Calculated Mean Temperature</b> of Month, .....	=	<u>42.9</u>
 <b>S.-R. THERMOMETER</b> , <b>Black Bulb in Sun, Highest</b> , (corrected for Index Errors), on the      th, .....		
"Corrected <b>Mean</b> ," (Col. 7), of <b>Black Bulb, Max. in Sun</b> , .....	=	.....
<b>Lowest at Night</b> , <b>Black Bulb</b> , (corrected for Index errors), on the      th, ...	=	.....
"Corrected <b>Mean</b> ," (Col. 8), of <b>Black Bulb, Min.</b> on grass, .....	=	.....
Difference of above Means or Range ("exposed"), .....	=	.....

<b>HYGROMETER, Mean</b> (corrected) A.M. and P.M. Reading of <b>Dry Bulb</b> , (Cols. 9 and 11), .....	=
<b>Mean</b> (corrected) A.M. and P.M. Reading of <b>Wet Bulb</b> , (Cols. 10 and 12), .....	=
## <b>Computed Temperature of Dew-Point</b> , .....	=
## <b>Do. Elastic Force of Vapour</b> , .....	=
## <b>Do. Weight of Vapour in a Cubic Foot of Air</b> , ...	=
## <b>Relative Humidity</b> , (Saturation = 100), .....	=
<b>RAIN</b> fell on <i>8</i> Days; Amount in Inches, .....	=

WIND.		SUMMARY.									
Direction.	N	NE	E	SE	S	SW.	W	NW	Calm or Variable.	Mean Force.	Mean Velocity in miles per day.
A. M.	5			123	1						
P. M.	4			323							
Mean.	4.5	0	0	2.23	1	0	0	0			

Observations made and  
Return verified by

(Signed) Wm. Andrew McDonald







## SCOTTISH METEOROLOGICAL SOCIETY.

Observations taken at The Garraun Clony faith, County of Aberdeen, in Lat. \_\_\_\_\_, Long. \_\_\_\_\_, Distance from Sea 14 miles.  
Height of Cistern of the Barometer above Mean Sea-level 280 feet, above Ground \_\_\_\_\_ feet. During the MONTH of May 1878.  
The Hours of Observation are of Greenwich Time.

ELECTRICITY.	Days of Month.	BAROMETER.		SELF-REGISTERING THERMOMETERS. Read Daily, at 9 P.M.		HYGROMETER.		WIND.		RAIN.		CLOUDS.		THERMOMETERS under Ground.		SEA.		OZONE.		GENERAL REMARKS. As to occurrence of Thunder, Lightning, Storms, Hail, Meteors, Remarkable Depression or Elevation of Barometer, Prevalent Diseases, etc. Mention the hour at which Storms, including Thunder and Lightning, began and ended.	Days of Month.											
		9 h. A.M.		9 h. P.M.		9 h. A.M.		9 h. P.M.		9 h. A.M.		9 h. P.M.		9 h. A.M.		9 h. P.M.		9 h. A.M.				9 h. P.M.										
		No.	Barometer.	No.	Barometer.	No.	Barometer.	No.	Barometer.	No.	Barometer.	No.	Barometer.	No.	Barometer.	No.	Barometer.	No.	Barometer.													
		inches.		inches.																												
	1	29.294	50	29.384	53	56	40														1											
	2	29.453	55	29.540	53	67	45														2											
	3	29.510	53	29.460	50	68	36														3											
	4	29.655	53	29.610	58	63	42														4											
	5	29.630	55	29.620	67	76	41														5											
	6	29.520	53	29.520	57	63	36														6											
	7	29.674	52	29.641	57	62	36														7											
	8	29.620	54	29.747	48	47	41														8											
	9	29.604	48	29.620	54	57	35														9											
	10	29.570	47	29.635	51	55	25														10											
	11	29.492	51	29.400	50	55	32														11											
	12	29.546	55	29.374	56	65	42														12											
	13	29.276	54	29.111	52	52	42														13											
	14	28.984	54	28.923	58	60	42														14											
	15	28.948	58	28.931	53	61	42														15											
	16	29.029	56	29.073	58	60	40														16											
	17	29.096	59	29.464	61	67	43														17											
	18	29.433	54	29.186	53	60	36														18											
	19	29.136	53	29.236	53	61	42														19											
	20	29.155	53	29.399	48	48	35														20											
	21	29.257	45	29.307	46	49	34														21											
	22	29.451	47	29.592	57	57	37														22											
	23	29.249	48	29.156	54	52	34														23											
	24	29.149	48	29.134	50	57	37														24											
	25	29.169	50	29.299	48	58	32														25											
	26	29.276	50	29.317	57	57	37														26											
	27	29.379	51	29.477	56	58	33														27											
	28	29.552	55	29.729	56	56	46														28											
	29	29.800	54	29.845	54	54	47														29											
	30	29.798	56	29.783	54	54	42														30											
	31	29.740	52	29.741	51	55	38														31											
Sums.		911.472	1671	910.409	1652	1817	1190																									
Means.		29.407	52.3	29.437	52.3	58.5	38.4																									
+ Total Corrections for Instrumental Errors.		+0.35		+0.35																												
+ Corrections for Diurnal Range.																																
"Corrected Means."																																
No. of Column.		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31

BAROMETER, "corrected Mean" at 9 A.M., minus the Correction for Temp. (Col. 2), = 29.374  
"Corrected Mean" of Barometer at 9 P.M., minus the Correction for Temp. (Col. 4), = 29.468  
Mean at Station, corrected, and at 32°, = 29.387  
Correction for height, feet above Mean Sea-level, = 308  
Mean, reduced to 32°, and Sea-level, = 29.695  
Highest Reading, corrected for Index error, on the 29th, = 29.895  
Lowest Do. Do., on the 14th, = 28.923  
Difference, or Monthly Range, = 1.122

S.-R. THERMOMETER, (in shade, etc.), Highest in Month, (corrected for Index Errors), on the 14th, = 76.0  
Lowest in Month, corrected for Index errors, on the 14th, = 25.0  
Difference, or Monthly Range, = 51.0  
"Corrected Mean" of all the Highest, (Col. 5), = 58.6  
"Corrected Mean" of all the Lowest, (Col. 6), = 38.4  
Difference, or Mean Daily Range, = 20.2  
\*\* Calculated Mean Temperature of Month, = 48.5

S.-R. THERMOMETER, Black Bulb in Sun, Highest, (corrected for Index Errors), on the 14th, = 76.0  
"Corrected Mean" (Col. 7), of Black Bulb, Max. in Sun, = 76.0  
Lowest at Night, Black Bulb, (corrected for Index errors), on the 14th, = 25.0  
"Corrected Mean" (Col. 8), of Black Bulb, Min. on grass, = 25.0  
Difference of above Means or Range ("exposed"), = 51.0

HYGROMETER, Mean (corrected) A.M. and P.M. Reading of Dry Bulb, (Cols. 9 and 11), = 52.3  
Mean (corrected) A.M. and P.M. Reading of Wet Bulb, (Cols. 10 and 12), = 52.3  
† Computed Temperature of Dew-Point, = 52.3  
† Do. Elastic Force of Vapour, = 52.3  
† Do. Weight of Vapour in a Cubic Foot of Air, = 52.3  
† Relative Humidity, (Saturation = 100), = 52.3  
RAIN fell on 10 Days; Amount in Inches, = 1.28

WIND.												SUMMARY.		
Direction.	N	NE	E	SE	S	SW	W	NW	Calm or Variable.	Mean Force.	Mean Velocity in miles per day.			
A.M.	1		1	1	1	1	1	1						
P.M.	1		1	1	1	1	1	1						
Mean.	1	0	1	1	1	1	1	1	0	0	0			

Observations made and  
Return verified by

(Signed)







# SCOTTISH METEOROLOGICAL SOCIETY.

Observations taken at The Lordsburg Army Castle, County of Arizona, in Lat. \_\_\_\_\_, Long. \_\_\_\_\_, Distance from Sea 17 miles.  
Height of Cistern of the Barometer above Mean Sea-level 780 feet, above Ground \_\_\_\_\_ feet. During the MONTH of June 1878.  
The Hours of Observation are of Greenwich Time.

[illegible]

<b>BAROMETER,</b> "corrected Mean" at 9 A.M., minus the Correction††	=	29.564
for Temp. (Col. 2), 29.637	=	29.602
"Corrected Mean" of Barometer at 9 P.M., minus the Correction††	=	29.583
for Temp. (Col. 4), 29.678	=	29.583
<b>Mean at Station, corrected, and at 32°,</b>	=	29.583
Correction for height, feet above Mean Sea-level,	=	305
<b>Mean, reduced to 32°, and Sea-level,</b>	=	29.888
Highest Reading, corrected for Index error, on the 27th,	=	29.946
Lowest Do. Do. on the 9th,	=	29.003
Difference, or <b>Monthly Range,</b>	=	0.853

<b>S.-R. THERMOMETER</b> , (in shade, etc.), <b>Highest in Month</b> , (corrected for Index Errors), on the 27 <sup>th</sup> .....	=	82.0
<b>Lowest in Month</b> , corrected for Index errors, on the 14 <sup>th</sup> .....	=	34.0
Difference, or <b>Monthly Range</b> , .....	=	48.0
"Corrected <b>Mean</b> " of all the <b>Highest</b> , (Col. 5), .....	=	63.5
"Corrected <b>Mean</b> " of all the <b>Lowest</b> , (Col. 6), .....	=	44.4
Difference, or <b>Mean Daily Range</b> , .....	=	19.1
** Calculated <b>Mean Temperature</b> of Month, .....	=	54.0
<b>S.-R. THERMOMETER</b> , <b>Black Bulb in Sun</b> , <b>Highest</b> , (corrected for Index Errors), on the 14 <sup>th</sup> .....	=	74.0
"Corrected <b>Mean</b> ," (Col. 7), of <b>Black Bulb, Max. in Sun</b> , .....	=	48.0
<b>Lowest at Night</b> , (Black Bulb, (corrected for Index errors), on the 14 <sup>th</sup> .....	=	34.0
"Corrected <b>Mean</b> ," (Col. 8), of <b>Black Bulb, Min.</b> on grass, .....	=	34.0
Difference of above Means or Range ("exposed"), .....	=	14.0

<b>HYGROMETER, Mean</b> (corrected) A.M. and P.M. Reading of <b>Dry Bulb</b> , (Cols. 9 and 11), .....	=	
<b>Mean</b> (corrected) A.M. and P.M. Reading of <b>Wet Bulb</b> , (Cols. 10 and 12), .....	=	
## Computed <b>Temperature of Dew-Point</b> , .....	=	
## Do. <b>Elastic Force of Vapour</b> , .....	=	
## Do. <b>Weight of Vapour in a Cubic Foot of Air</b> , ...	=	
## <b>Relative Humidity</b> , (Saturation = 100), .....	=	
<b>RAIN</b> fell on <i>8</i> Days; Amount in Inches, .....	=	<i>2.81 in</i>

WIND.		SUMMARY.									
Direction.	N	NE	E	SE	S	SW	W	NW	Calm or Variable.	Mean Force.	Mean Velocity in miles per day
A.M.	3			2	5						
P.M.				5	3						
Mean.	4	0	0	2	4	0	0	0	0		

Observations made and  
Return verified by

(Signed) Richard McDonald







# SCOTTISH METEOROLOGICAL SOCIETY.

Observations taken at The Cornucopia, Alameda, County of Alameda, in Lat. \_\_\_\_\_, Long. \_\_\_\_\_, Distance from Sea 17 miles.  
Height of Cistern of the Barometer above Mean Sea-level 280 feet, above Ground \_\_\_\_\_ feet. During the MONTH of July

The Hours of Observation are of Greenwich Time.

[illegible]

<b>BAROMETER,</b> "corrected Mean" at 9 A.M., <i>minus</i> the Correction $\{ + \}$		
for Temp. (Col. 2), = <u>29.749</u> — <u>0.066</u>	=	<u>29.663</u>
<b>"Corrected Mean" of Barometer</b> at 9 P.M., <i>minus</i> the Correction $\{ + \}$		
for Temp. (Col. 4), = <u>29.753</u> — <u>0.080</u>	=	<u>29.673</u>
<b>Mean at Station, corrected, and at 32°,</b> .....	=	<u>29.668</u>
Correction for height, feet above Mean Sea-level,.....	=	<u>302</u>
<b>Mean, reduced to 32°, and Sea-level,</b> .....	=	<u>29.970</u>
Highest Reading, corrected for Index error, on the 5 <sup>th</sup> ,.....	=	<u>30.140</u>
Lowest Do. Do. on the 9 <sup>th</sup> ,.....	=	<u>29.363</u>
Difference, or <b>Monthly Range,</b> .....	=	<u>0.777</u>

<b>S.-R. THERMOMETER</b> , (in shade, etc.), <b>Highest in Month</b> , (corrected for Index Errors), on the 19 <sup>th</sup> .....	=	84.5
<b>Lowest in Month</b> , corrected for Index errors, on the 31 <sup>st</sup> th, .....	=	36.0
Difference, or <b>Monthly Range</b> , .....	=	48.0
"Corrected <b>Mean</b> " of all the <b>Highest</b> , (Col. 5), .....	=	68.2
"Corrected <b>Mean</b> " of all the <b>Lowest</b> , (Col. 6), .....	=	149.6
Difference, or <b>Mean Daily Range</b> , .....	=	78.6
** Calculated <b>Mean Temperature</b> of Month, .....	=	58.9
<hr/>		
<b>S.-R. THERMOMETER</b> , <b>Black Bulb in Sun</b> , <b>Highest</b> , (corrected for Index Errors), on the th.....	=	
"Corrected <b>Mean</b> ," (Col. 7), of <b>Black Bulb</b> , <b>Max. in Sun</b> , .....	=	
<b>Lowest at Night</b> , Black Bulb, (corrected for Index errors), on the th... =	=	
"Corrected <b>Mean</b> ," (Col. 8), of <b>Black Bulb</b> , <b>Min.</b> on grass, .....	=	
Difference of above Means or Range ("exposed"), .....	=	

<b>HYGROMETER, Mean</b> (corrected) A.M. and P.M. Reading of <b>Dry Bulb</b> , (Cols. 9 and 11), .....	=
<b>Mean</b> (corrected) A.M. and P.M. Reading of <b>Wet Bulb</b> , (Cols. 10 and 12), .....	=
‡‡ <b>Computed Temperature of Dew-Point</b> , .....	=
‡‡ <b>Do. Elastic Force of Vapour</b> , .....	=
‡‡ <b>Do. Weight of Vapour in a Cubic Foot of Air</b> , ...	=
‡‡ <b>Relative Humidity</b> , (Saturation = 100), .....	=
<b>RAIN</b> fell on <b>6 Days; Amount in Inches</b> , .....	=

RAIN fell on 6 Days; Amount in Inches, ..... = 0.76

WIND.	SUMMARY.											
	Direction.	N	NE	E	SE	S	SW	W	NW	Calm or Variable.	Mean Force.	Mean Velocity in miles per hour.
A.M.	5					26						
P.M.	5					26						
Mean.	5	0	0	0	0	26	0	0	0	0		

Each instrument tested at the Office in Edinburgh bears the stamp "S.M.S." and a number to be entered in the Heading; or the Number and Initials of the Maker may be here given.

Embracing corrections for both capability and Index Errors.

The Diurnal Range for Scotland is as yet unknown.

*Practically*, though not *absolutely* a missis correction.

From Glaisher's *Hygrometrical Tables*, Second Edition *only*.

While the Diurnal Range is unknown, the Arithmetical Mean of  $\phi$ , 5 and 6 will be entered as the "Calculated Mean Temperature."

*Any* Observations not taken under the conditions specified in the Instructions on the other side, or noted at the Top of each column, are to be marked with a cross.

See Sec. 10.

Observations made and  
Return verified by

(Signed







# SCOTTISH METEOROLOGICAL SOCIETY.

Observations taken at the Larrows <sup>Ring castle</sup> ~~place~~, County of Merleens, in Lat. \_\_\_\_\_, Long. \_\_\_\_\_, Distance from Sea 17 miles.

Height of Cistern of the Barometer above Mean Sea-level 280 feet, above Ground \_\_\_\_\_ feet.

During the MONTH of August 1878

The Hours of Observation are of Greenwich Time.

[illegible]

BAROMETER, "corrected Mean" at 9 A.M., minus the Correction $\uparrow$ ) for Temp. (Col. 2),	29.506	776	=	29.430
"Corrected Mean" of Barometer at 9 P.M., minus the Correction $\uparrow$ ) for Temp. (Col. 4),	29.505	777	=	29.428
Mean at Station, corrected, and at 32°,.....			=	29.429
Correction for height, feet above Mean Sea-level,.....			=	303
Mean, reduced to 32°, and Sea-level,.....			=	29.732
Highest Reading, corrected for Index error, on the th,.....			=	30.009
Lowest Do. Do., on the th,.....			=	28.921
Difference, or Monthly Range,.....			=	1.178

**S.-R. THERMOMETER**, (in shade, etc.), **Highest in Month**, (corrected for Index Errors), on the 4 th, ..... = 82.0

**Lowest in Month**, corrected for Index errors, on the 2 th, ..... = 39.0

Difference, or **Monthly Range**, ..... = 43.0

"Corrected **Mean**" of all the **Highest**, (Col. 5), ..... = 64.9

"Corrected **Mean**" of all the **Lowest**, (Col. 6), ..... = 50.8

Difference, or **Mean Daily Range**, ..... = 14.1

\*\* Calculated **Mean Temperature** of Month, ..... = 57.9

**S.-R. THERMOMETER**, (in shade, etc.), **Highest in Month**, (corrected for Index Errors), on the 4 th, ..... = 82.0

**Lowest in Month**, corrected for Index errors, on the 2 th, ..... = 39.0

Difference, or **Monthly Range**, ..... = 43.0

"Corrected **Mean**" of all the **Highest**, (Col. 5), ..... = 64.9

"Corrected **Mean**" of all the **Lowest**, (Col. 6), ..... = 50.8

Difference, or **Mean Daily Range**, ..... = 14.1

\*\* Calculated **Mean Temperature** of Month, ..... = 57.9

<b>S.-R. THERMOMETER, Black Bulb in Sun, Highest,</b>	(corrected for	
Index Errors), on the	th,	=
<b>"Corrected Mean,"</b> (Col. 7), <b>of Black Bulb, Max. in Sun,</b>		
<b>Lowest at Night,</b> Black Bulb, (corrected for Index errors), on the	th, ...	=
<b>"Corrected Mean,"</b> (Col. 8), <b>of Black Bulb, Min.</b> on grass,		=
Difference of above Means or Range ("exposed"),		=

**HYGROMETER, Mean** (corrected) A.M. and P.M. Reading of Dry Bulb, (Cols. 9 and 11), ..... =

Mean (corrected) A.M. and P.M. Reading of Wet Bulb, (Cols.

10 and 12),.....

++ Computed **Temperature of Dew Point**.....

```
## Computed Temperature of Dew-Point, ..... =
## Do. Elastic Force of Vapour, ..... =
```

## Do. **Weight of Vapour in a Cubic Foot of Air, ... =**

## Relative Humidity, (Saturation = 100), ..... =

**RAIN** fell on 20 Days; Amount in Inches,

WIND.		SUMMARY.									
Direction.	N	NE	E	SE	S	SW	W	NW	Calm or Variable.	Mean Force.	Mean Velocity in miles per day.
A.M.	3			11	8						
P.M.	2			12	4	1	2				
Mean.	2	0	0	12	6	0	1				

Observations made and  
Return verified by

(Signed)







# SCOTTISH METEOROLOGICAL SOCIETY.

Observations taken at Thornton's Ferry, Castle, County of Sherrard, in Lat.       , Long.       , Distance from Sea 47 miles.

Height of Cistern of the Barometer above Mean Sea-level 280 feet, above Ground \_\_\_\_\_ feet.

During the MONTH of September 1878.

The Hours of Observation are of Greenwich Time.

[illegible]

<b>BAROMETER,</b> "corrected Mean" at 9 A.M., <i>minus</i> the Correction $\uparrow\uparrow$	=	29.447
for Temp. (Col. 2), = 29.519 ... 0.072		
<b>"Corrected Mean" of Barometer at 9 P.M., <i>minus</i> the Correction <math>\uparrow\uparrow</math></b>	=	29.453
for Temp. (Col. 4), = 29.523 ... 0.074		
<b>Mean at Station, corrected, and at 32°,.....</b>	=	29.450
Correction for height, feet above Mean Sea-level,.....	=	304
<b>Mean, reduced to 32°, and Sea-level,.....</b>	=	29.754
Highest Reading, corrected for Index error, on the 1 th,.....	=	29.874
Lowest Do. Do. on the 15 th,.....	=	28.586
Difference, or <b>Monthly Range</b> ,.....	=	1.341

**S.-R. THERMOMETER**, (in shade, etc.), **Highest in Month**, (corrected for Index Errors), on the th, ..... = 75.0

**Lowest in Month**, corrected for Index errors, on the th, ..... = 37.0

Difference, or **Monthly Range**, ..... = 38

"Corrected **Mean**" of all the **Highest**, (Col. 5), ..... = 62.5 62.5

"Corrected **Mean**" of all the **Lowest**, (Col. 6), ..... = 45.9 46

Difference, or **Mean Daily Range**, ..... = 16.6 16

**\*\* Calculated Mean Temperature** of Month, ..... = 39.3 39.3

---

**S.-R. THERMOMETER**, **Black Bulb in Sun, Highest**, (corrected for Index Errors), on the th, ..... =

"Corrected **Mean**," (Col. 7), of **Black Bulb, Max. in Sun**, ..... =

**Lowest at Night**, **Black Bulb**, (corrected for Index errors), on the th, ... =

"Corrected **Mean**," (Col. 8), of **Black Bulb, Min.** on grass, ..... =

Difference of above Means or Range ("exposed"), ..... =

<b>HYGROMETER, Mean</b> (corrected) A.M. and P.M. Reading of <b>Dry Bulb</b> , (Cols. 9 and 11), .....	=	
<b>Mean</b> (corrected) A.M. and P.M. Reading of <b>Wet Bulb</b> , (Cols. 10 and 12), .....	=	
# <b>Computed Temperature of Dew-Point</b> , .....	=	
# <b>Do. Elastic Force of Vapour</b> , .....	=	
# <b>Do. Weight of Vapour in a Cubic Foot of Air</b> , ..	=	
# <b>Relative Humidity</b> , (Saturation = 100), .....	=	
<b>RAINF</b> fell on $\frac{1}{5}$ Days; Amount in Inches, .....	=	<i>3.2 in</i>

WIND.		SUMMARY.									
Direction.	N	NE	E	SE	S	SW	W	NW	Calm or Variable.	Mean Force.	Mean Velocity in miles per day.
A.M.	3	4		4	14	2					
P.M.	4	3		1	18	1					
Mean.	3	4	0	5	16	2					

Observations made and  
Return verified by

(Signed)



Henry  
September  
1848

 $T_0$ 

Mr. ALEXANDER BUCHAN,

*Secretary of the Meteorological Society of Scotland,*

EDINBURGH.

The growth has been most favourable for increasing production, and the quantity of seed has increased in consequence of the early ripening of the plants, and the abundance of the seed.

[illegible][illegible]

OBSERVATIONS IN CONNECTION WITH THE PERIODICAL RETURN OF THE SEASONS.

Feindliche Decretale 1877.

(By Order)



# SCOTTISH METEOROLOGICAL SOCIETY.

Observations taken at Clumy Cas, County of \_\_\_\_\_, in Lat. \_\_\_\_\_, Long. \_\_\_\_\_, Distance from Sea \_\_\_\_\_ miles.  
Height of Cistern of the Barometer above Mean Sea-level \_\_\_\_\_ feet, above Ground \_\_\_\_\_ feet. During the MONTH of October 1878.  
The Hours of Observation are of Greenwich Time.

[illegible]

BAROMETER, "corrected Mean" at 9 A.M., <i>minus</i> the Correction $\uparrow \uparrow$		=	29.256
for Temp. (Col. 2), = 29.215. — .057.			
"Corrected Mean" of Barometer at 9 P.M., <i>minus</i> the Correction $\uparrow \uparrow$		=	29.261
for Temp. (Col. 4), = 29.220. — .057.			
Mean at Station, corrected, and at 32°,.....		=	29.259
Correction for height,	feet above Mean Sea-level,.....	=	208
Mean, reduced to 32°, and Sea-level,.....		=	29.567
Highest Reading, corrected for Index error, on the 2 th,.....		=	29.960
Lowest	Do. Do., on the 21 th,.....	=	28.140
Difference, or Monthly Range,.....		=	1.820

<b>S.-R. THERMOMETER</b> , (in shade, etc.), <b>Highest in Month</b> , (corrected for Index Errors), on the      th, .....	=	<u>67.0</u>
<b>Lowest in Month</b> , corrected for Index errors, on the      th, .....	=	<u>27.0</u>
Difference, or <b>Monthly Range</b> , .....	=	<u>40.0</u>
"Corrected <b>Mean</b> " of all the <b>Highest</b> , (Col. 5), .....	=	<u>53.9</u>
"Corrected <b>Mean</b> " of all the <b>Lowest</b> , (Col. 6), .....	=	<u>42.5</u>
Difference, or <b>Mean Daily Range</b> , .....	=	<u>11.4</u>
<b>** Calculated Mean Temperature</b> of Month, .....	=	<u>48.2</u>
<hr/>		
<b>S.-R. THERMOMETER</b> , <b>Black Bulb in Sun, Highest</b> , (corrected for Index Errors), on the      th, .....	=	.....
"Corrected <b>Mean</b> ," (Col. 7), of <b>Black Bulb, Max. in Sun</b> , .....	=	.....
<b>Lowest at Night</b> , <b>Black Bulb</b> , (corrected for Index errors), on the      th, ...	=	.....
"Corrected <b>Mean</b> ," (Col. 8), of <b>Black Bulb, Min.</b> on grass, .....	=	.....
Difference of above Means or Range ("exposed"), .....	=	.....

<b>HYGROMETER, Mean</b> (corrected) A.M. and P.M. Reading of Dry Bulb, (Cols. 9 and 11), .....	=	
<b>Mean</b> (corrected) A.M. and P.M. Reading of Wet Bulb, (Cols. 10 and 12), .....	=	
<b>Computed Temperature of Dew-Point,</b> .....	=	
<b>Do. Elastic Force of Vapour,</b> .....	=	
<b>Do. Weight of Vapour in a Cubic Foot of Air, ...</b> .....	=	
<b>Relative Humidity, (Saturation = 100),</b> .....	=	
<b>RAIN</b> fell on $\frac{1}{5}$ Days; Amount in Inches, .....	=	3.39

WIND.		SUMMARY.									
Direction.	N	NE	E	SE	S	SW	W	NW	Calm or Variable.	Mean Force.	Mean Velocity in miles per day.
A.M.	7	0	0	4	8	2					
P.M.	7	1	0	5	16	2					
Mean.	7	0	0	5	17	2	0	0	0		

Observations made and  
Return verified by

(Signed)

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# SCOTTISH METEOROLOGICAL SOCIETY.

Observations taken at The Gardens Cluny Castle, County of Monaghan, in Lat. \_\_\_\_\_, Long. \_\_\_\_\_, Distance from Sea 17 miles.  
Height of Cistern of the Barometer above Mean Sea-level 280 feet, above Ground \_\_\_\_\_ feet. During the MONTH of December 1878.  
The Hours of Observation are of Greenwich Time.

[illegible]

<b>BAROMETER,</b> "corrected Mean" at 9 A.M., <i>minus</i> the Correction $\uparrow$ )	=	29.355
for Temp. (Col. 2), = 29.380 - .025	=	29.355
<b>"Corrected Mean" of Barometer at 9 P.M., <i>minus</i> the Correction <math>\uparrow</math>)</b>	=	29.356
for Temp. (Col. 4), = 29.380 - .024	=	29.356
<b>Mean at Station, corrected, and at 32°,.....</b>	=	29.356
Correction for height, feet above Mean Sea-level,.....	=	321
<b>Mean, reduced to 32°, and Sea-level,.....</b>	=	29.677
Highest Reading, corrected for Index error, on the 5th,.....	=	30.074
Lowest Do. Do., on the 31th,.....	=	28.550
Difference, or <b>Monthly Range</b> ,.....	=	1.524

**S.-R. THERMOMETER**, (in shade, etc.), **Highest in Month**, (corrected for Index Errors), on the 30th, ..... = 44.0

**Lowest in Month**, corrected for Index errors, on the ..... th, ..... = 03.0

Difference, or **Monthly Range**, ..... = 41.0

" **Corrected Mean** " of all the **Highest**, (Col. 5), ..... = 34.9

" **Corrected Mean** " of all the **Lowest**, (Col. 6), ..... = 21.4

Difference, or **Mean Daily Range**, ..... = 13.5

\*\* Calculated **Mean Temperature** of Month, ..... = 28.2

<b>S.-R. THERMOMETER, Black Bulb in Sun, Highest,</b>	(corrected for	
Index Errors), on the	th,	=
<b>"Corrected Mean,"</b>	(Col. 7), of <b>Black Bulb, Max. in Sun,</b>	=
<b>Lowest at Night,</b>	Black Bulb, (corrected for Index errors), on the	th, ... =
<b>"Corrected Mean,"</b>	(Col. 8), of <b>Black Bulb, Min.</b>	on grass, ... =
Difference of above Means or Range ("exposed"),		=

<b>HYGROMETER, Mean (corrected) A.M. and P.M. Reading of Dry Bulb,</b> (Cols. 9 and 11), .....		=
<b>Mean (corrected) A.M. and P.M. Reading of Wet Bulb,</b> (Cols. 10 and 12), .....		= <i>K.B. When uncertain</i>
## Computed <b>Temperature of Dew-Point,</b> .....		= <i>to be one-twelfth of the average depth of evening, when there is no falling</i>
## Do. <b>Elastic Force of Vapour,</b> .....		= <i>one-fifth or no falling</i>
## Do. <b>Weight of Vapour in a Cubic Foot of Air,</b> ...		= <i>one-fifth or no falling</i>
## <b>Relative Humidity, (Saturation = 100),</b> .....		=
<b>RAIN</b> fell on <i>8</i> Days; Amount in Inches, .....		= <i>20</i> <i>Seven and</i> <i>Raw</i>

WIND.		SUMMARY.									
Direction.	N	NE	E	SE	S	SW	W	NW	Calm or Variable.	Mean Force.	Mean Velocity in miles per day.
A.M.	15	2	1	1			3		10		
P.M.	5	3	1	2			1	1	9		
Mean.	10	2	0	2	1	0	1	0	10		

Observations made and  
Return verified by

(Signed)



Ching  
Dec. 1894

[illegible]

to be on the changes in the direction of the winds, the occurrence of storms, extra observations at every hour of Greenwich time. Such a system of simultaneous observation, pursued at different Stations, is likely to give highly valuable and important results, particularly in connection with the system of thickly-planted Stations over a large area of the country. The first object of the systematic investigation of the relation of the force of the wind to the Barometric Gradients, and other points connected with them.

Fortunately, spirit Thermometers may be easily set right by the removal of the column of spirit chances to separate. Let the Thermometer be placed in a glass of water, and the bulb, with the stem and foot, and footless, from the bulb, be raised above the fluid, and the column of spirit will rise, and the object, being on the principal of centrifugal force, to the detached portion of spirit, till it unites with the column. A few throws, or swinging strokes, will be sufficient for the purpose; after which the Thermometer should be placed in a slanting position, and the rest of the spirit still being in the sides of the tube, the column will rise, and the spirit will be separated, perfectly unobscurable station for observation.

A few throws, of swinging strokes, will generally be sufficient for the purpose; after which the Thermometer should be placed in a slanting position, allowing the rest of the spirit still adhering to the sides of the tube to fall down, and the thermometer to be again inverted. If the method is adopted, if the portion of spirit remaining on the surface of the least should be placed slowly and cautiously to the top and of the tube, where the detached portion of spirit is, which, being turned over to vapour by the heat, will condense on the surface of the unbroken column of spirit. Care must be taken that a near is not applied to the tube, many causes conspire to produce anomalies in Rain Returns, arising partly from the difficulty of obtaining a perfectly unobstructed situation for observation, and partly from the defective nature of the instruments used. This latter cause should be placed on a slope or terrace, but on a level piece of ground in the open air, where the position can secure for it. As it is often difficult to obtain a position as free and unobstructed by surrounding objects as is desirable, the observer should be taken to place it at some distance from shrubs,

The bulbs will serve as thermometers for registering the greatest heat which the bulb will stand. The bulbs should be made of glass of the thinnest possible wall, and should be filled with a non-expanding liquid, such as alcohol, or a mixture of alcohol and water, or a mixture of alcohol and ether. The bulbs should be made of glass of the thinnest possible wall, and should be filled with a non-expanding liquid, such as alcohol, or a mixture of alcohol and water, or a mixture of alcohol and ether. The bulbs should be made of glass of the thinnest possible wall, and should be filled with a non-expanding liquid, such as alcohol, or a mixture of alcohol and water, or a mixture of alcohol and ether.

Snow-falls may, for convenience, be registered in the rain columns, under the following conditions:—When a Snow-fall occurs, it is not necessary to stop the rain-gauge, and the latter should be kept in operation until the snow ceases, it is then to be noted in the "Remarks," and the depth of water received in the Gauge. The depth of the snow must be noted in the "Remarks," upon the indications of the Rain-Gauge. If no wind, rain, and snow, as indicated in every column, the Observer cannot be too careful to register observations only; and nothing that strikes of the nature of a blizzard, or any other storm, should be omitted.

attend to the following conditions:—The bulls must hang they are intended for the sale and the frame to which they are attached; the frame must be tall enough to allow the hind legs of the animal to be raised up to the level of the withers, and the hind feet must be covered, not altogether placed to the side, and a little below the level of the wet bulb, but in case under the bulb; the hind legs must be of medium fineness, and distended at the neck of the hump by the corner, which also supplies it with skin. It must be straight, and the skin is very close and moist. The hind feet must be of the size of a water pipe, and the water pipe. In those years when the

In reading the Thermometer great care must be taken to bring the eye exactly opposite the tip of the index to the column of mercury. The reading ought to be taken to tenths of a degree, and noted in decimals. Thus, if the Thermometer will read  $33^{\circ}$ ,  $40^{\circ}$ , or  $40^{\circ} \cdot 1$ ; or again,  $40^{\circ}$ ,  $40^{\circ} \cdot 6$ ,  $40^{\circ} \cdot 7$ ,  $40^{\circ} \cdot 8$ ,  $40^{\circ} \cdot 9$ ,  $41^{\circ}$ , or  $41^{\circ} \cdot 1$ ; or again,  $40^{\circ}$ ,  $40^{\circ} \cdot 1$ ,  $40^{\circ} \cdot 2$ ,  $40^{\circ} \cdot 3$ ,  $40^{\circ} \cdot 4$ ,  $40^{\circ} \cdot 5$ ,  $40^{\circ} \cdot 6$ ,  $40^{\circ} \cdot 7$ ,  $40^{\circ} \cdot 8$ ,  $40^{\circ} \cdot 9$ ,  $41^{\circ}$ , or  $41^{\circ} \cdot 1$ , the reading should be noted as  $40 \cdot 2$ ,  $40 \cdot 3$ , or  $40 \cdot 8$  respectively. In reading Rutherford's Minimum

24 hours preceding. It is not a matter of indifference to the Self-Registering Thermometers are read, since, in winter months, the sun is at a low angle, and the rays cast shadows, should be entered in the proper column. As the germination and growth of crops and plants generally, depend greatly on the temperature, the Self-Registering Thermometer is of great importance, and consistency—the Council recommend that Observations in this interesting department be made at 9 A.M., by Thermometers permanently fixed in the soil, their bulbs being sunk to depths of 3, 12, and 22 inches, and the stems above ground protected from the sun's rays, and fixed with sloping taut twines, to prevent the wind from blowing them over.

**Verification of Thermometers.**—The thermometers, as are not graduated on the stem, but merely on an attached scale, undergo repairs, they are very liable to be moved from their position on the scale, and are never afterwards to be used. The scales of the Standard and the minimum thermometers, ought frequently to be compared with the bulb of the Hygrometer. The freezing-point of each thermometer, marked by a scratch on the tube, ought to be tested once a year, in snow or melting ice.

**Thermometers.**—The following points require attention:—(1) The thermometer, the vessel of expansion, and the air-tight stopper, must be examined frequently, to detect the perfect freedom of the thermometer from any source of disturbance.

bering of the scale of every instrument; the rejection of Thermometers, the frameworks of which are not likely to stand exposure to the weather, as shown in the past by repeated and annoying breakages of Thermometers of similar construction; and as regards Maximum Thermometers, either Negretti and Zambetti, or Phillips's, whether they will act at the highest temperatures they may be required to register. By the laws of the Society, Members and Observers have a right to have their instruments compared by the Secretary, and to address with criticism any instrument which is found to be

storms, extra observations at every hour of Greenwich time. Such a system of simultaneous observation, pursued at different Stations, is likely to give highly valuable and important results, particularly in connection with the system of thickly-planted Stations over a limited district round Edinburgh called STORM STATIONS, in the course of being established by the Society for the systematic investigation of the relation of the force of the wind to BAROMETRIC GRADIENTS, and other points connected with storms.

observation may be ascertained. For indicating the Force of the Wind at any particular hour of observation, the Pressures Anemometer recently brought under the notice of the Society by Mr. Stevenson, the Honorary Secretary, and Mr. R. Ballgal, the Society's Observer at Edinb., are recommended as likely to secure uniformity in making observations on the Force of the Wind.

Many causes conspire to produce anomalies in Rain; Returns arising partly from the difficulty of obtaining a perfectly unobscurable situation for observation,

The Run Gauge must be perfectly level, and fixed so that it will remain level in all weathers, and be at a height of one foot above ground, over grass. In such gauges as Plumley's, which are furnished with a measuring wheel attached to a float, the wheel ought to be fixed down, and the float rise to its height only at the time the instrument is read; it being found that when projecting above the rim of the float, seriously interferes with the proper measurement of the Rain-fall. When a measuring glass is used, care should be taken to hold it quite perpendicular. The Rain Gauge ought to be read daily at 9

Snow-falls may, for convenience, be registered in the following conditions:—When a Snow-shale<sup>1</sup> occurs, the depth of water received in the gutter and the letter S affixed to the top of the 'Remarks,' and the letter S added to the depth of water received in the Gauge. The depth of the snow must be measured in some open place where no drift is observed, and registered in addition to, and as a check upon, the indications of the Rain-Gauge. For wind, rain, and snow, as noticed in every column, the Observer cannot be too careful to register observations only; and nothing that partakes of the nature

Convenient abbreviations for the nomenclature of Clouds will be found on the other side. The amount of Cloud ought to be estimated from the greater or less observation of the sky overleaved (*i.e.*, within  $20^{\circ}$  or  $30^{\circ}$  of the zenith). The strata of Clouds that appear near the horizon are viewed obliquely; and thus, being unable to judge of their amount, we ought not to take them into account in the Clouds' column, though their appearance and changes may be noted among the Remarks. The amount of Clouds is fixed from a scale of 0 to 10; thus, when the sky overleaved is free from Clouds it is entered 0; when half is overleaved

\_\_\_\_\_ will indicate that the upper strata of clouds travel with extreme velocity from S.W., and those in the lower regions from W., with one-third the speed of the former. Again, in the second <sup>4</sup> st. Cloud column, an entry of \_\_\_\_\_ will indicate that the higher <sub>2</sub> enst.

assist materially in the development of a more exact nomenclature of Clouds as well as throw light on the electrical, and other of the more obscure phenomena of Meteorology.

The approximate number of Hours in which objects in the sun's rays cast shadows, should be entered in the proper column.

As the germination and growth of crops and plants generally, depend greatly on the temperature of the soil—its amount and constancy,—the Council recommend that

*Underground  
Thermometers.*

ground prevented from the sun's rays, and fitted with sloping tin collars, to prevent rain water being conveyed to the bulbs by the stems or wooden frames. A knowledge of the Temperature of the Sea is not only in itself, but in its relation to that of our island, a most important branch of Meteorology. The Council therefore recommend that the Temperature of the Sea be carefully taken by a properly constructed apparatus, from boats, if it be impracticable, from the ends of piers and rocks round the island, and at such places as are exposed to the influence of the river water, and at little distance from the shore, as far as possible, by means of a thermometer, the temperature of the land, either directly heated by the sun, or cooled by nocturnal radiation. At one o'clock the state of the air

"Turnips, Urrets, etc., whether plentiful or in perfection; whether any have succeeded in raising or collecting material in the crops of grain, Hay, Potatoes, &c.; whether prevalent among cattle; and the Agricultural condition of the district generally."

[illegible]

*Secret*

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