

SCOTTISH METEOROLOGICAL SOCIETY.

Observations taken at Aboyne Castle, County of Aberdeen, in Lat. _____, Long. _____, Distance from Sea 31 miles.
Height of Cistern of the Barometer above Mean Sea-level 453.3 feet, above Ground 4 feet. During the MONTH of January
The Hours of Observation are of Greenwich Time.

[illegible]

BAROMETER, "corrected Mean" at 9 A.M., minus the Correction ++	=	29.550
for Temp. (Col. 2), = 9.596... - 046...		
Corrected Mean " of Barometer at 9 P.M., minus the Correction ++	=	29.573
for Temp. (Col. 4), = 9.621... - 048...		
Mean at Station, corrected, and at 32°,.....	=	29.562
		507
Correction for height, feet above Mean Sea-level,.....	=	
		30.069
Mean, reduced to 32°, and Sea-level,.....	=	
		30 - 325
Highest Reading, corrected for Index error, on the 18 th,.....	=	28 - 200
Lowest Do. Do., on the 2 th,.....	=	
		2.125
Difference, or Monthly Range ,.....	=	

S.-R. THERMOMETER , (in shade, etc.), Highest in Month , (corrected for Index Errors), on the	th,.....	=	
Lowest in Month , corrected for Index errors, on the	2) th,	=	24.0
Difference, or Monthly Range ,		=	
"Corrected Mean " of all the Highest , (Col. 5),		=	
"Corrected Mean " of all the Lowest , (Col. 6),		=	32.5
Difference, or Mean Daily Range ,		=	
** Calculated Mean Temperature of Month,		=	
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),	=	38-1
Mean (corrected) A.M. and P.M. Reading of Wet Bulb , (Cols. 10 and 12),	=	37-0
‡ Computed Temperature of Dew-Point ,	=	35-5
‡ Do. Elastic Force of Vapour ,	=	007
‡ Do. Weight of Vapour in a Cubic Foot of Air , ... =		
‡ Relative Humidity , (Saturation = 100),	=	90
RAIN fell on 9 Days; Amount in Inches,	=	1-16

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		2	1	9	14	3			
P.M.		1		2	3	9	9	7			
Mean.	0	1	0	2	2	9	12	5	0	—	

Observations made and
Return verified by

(Signed)

SCOTTISH METEOROLOGICAL SOCIETY.

Observations taken at Obogue Gardens, County of Aberdeen, in Lat. _____, Long. _____, Distance from Sea 31 miles.
Height of Cistern of the Barometer above Mean Sea-level 453.3 feet, above Ground 4 feet. During the MONTH of February 1882.
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, began and ended.	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. No.	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.	Hours.	No.					3 inches.	12 inches.	No.	22 inches.																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																								
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BAROMETER, "corrected Mean" at 9 A.M., minus the Correction†† = 29.438
for Temp. (Col. 2), = 9.48.6 - 0.48...
Corrected Mean" of Barometer at 9 P.M., minus the Correction†† = 29.486
for Temp. (Col. 4), = 9.53.7 - 0.51...
Mean at Station, corrected, and at 32°, = 29.462
Correction for height, feet above Mean Sea-level, = 504
Mean, reduced to 32°, and Sea-level, = 29.966
Highest Reading, corrected for Index error, on the 21 th, = 30.150
Lowest Do. Do., on the 26 th, = 28.400
Difference, or Monthly Range, = 1.750

* 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 capillarity and Index Errors.
†† The Diurnal Range for Scotland is as yet unknown.
‡ These "Hygrometrical Deductions" are calculated from Glaisher's Hygrometrical Tables, Second Edition only.
‡‡ While the Diurnal Range is unknown, the Arithmetic Mean of Cols. 5 and 6 will be entered as the "Calculated Mean Temperature."
Any Observations not taken under the conditions specified in the Directions on the other side, or noted at the Top of each column, must be marked as such by the observer, in each Schedule. See over.

S.-R. THERMOMETER, (in shade, etc.), Highest in Month, (corrected for Index Errors), on the th, =
Lowest in Month, corrected for Index errors, on the 16 th, = 20.0
Difference, or Monthly Range, =
"Corrected Mean" of all the Highest, (Col. 5), =
"Corrected Mean" of all the Lowest, (Col. 6), = 31.7
Difference, or Mean Daily Range, =
** Calculated Mean Temperature of Month, =
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), = 39.9
Mean (corrected) A.M. and P.M. Reading of Wet Bulb, (Cols. 10 and 12), = 38.4
† Computed Temperature of Dew-Point, = 36.4
† Do. Elastic Force of Vapour, = 2.16
† Do. Weight of Vapour in a Cubic Foot of Air, =
† Relative Humidity, (Saturation = 100), = 88
RAIN fell on 14 Days; Amount in Inches, = 1.40

WIND.		SUMMARY.					
Direction.	N	NE	E	SE	S	SW	W
A.M.	2	1		3		6	11
P.M.	2	2		2		9	12
Mean.	2	1	0	3	0	8	12

Observations made and
Return verified by

(Signed)

George H. Hughes

SCOTTISH METEOROLOGICAL SOCIETY.

Observations taken at Obogan Castle, County of Aberdeen, in Lat. _____, Long. _____, Distance from Sea 31 miles.

Height of Cistern of the Barometer above Mean Sea-level 453.5 feet, above Ground 4 feet.

During the MONTH of March 1882.

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.	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.		No. of hours in which it fell.	Amount in inches. No.	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.	Min. on Grass.	Dry bulb.	Wet bulb.	Dry bulb.	Wet bulb.	Direction.	Force.	Direction.	Force.			Readings of the H.Cup Anemometer. No.	9 h. A.M.	Velocity (0—6), and Direction.	Amount (0—10), and Species.	Velocity (0—6), and Direction.	Amount (0—10), and Species.	No.					No.	No.																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																							
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BAROMETER, "corrected Mean" at 9 A.M., minus the Correction†† = 29.192
 for Temp. (Col. 2), = 2.244... - 0.522 = 29.235
 Corrected Mean" of Barometer at 9 P.M., minus the Correction†† = 29.235
 for Temp. (Col. 4), = 2.287... - 0.522 = 29.213
 Mean at Station, corrected, and at 32° = 29.213
 Correction for height, feet above Mean Sea-level, = .501
 Mean, reduced to 32°, and Sea-level, = 29.714
 Highest Reading, corrected for Index error, on the th, = 29.975
 Lowest Do. Do., on the th, = 28.600
 Difference, or Monthly Range, = 1.375

S.-R. THERMOMETER, (in shade, etc.), Highest in Month, (corrected for Index Errors), on the 6 th, = 25.0
 Lowest in Month, corrected for Index errors, on the 6 th, = 25.0
 Difference, or Monthly Range, = 0
 "Corrected Mean" of all the Highest, (Col. 5), = 32.4
 "Corrected Mean" of all the Lowest, (Col. 6), = 32.4
 Difference, or Mean Daily Range, = 0
 ** Calculated Mean Temperature of Month, = 0
 S.-R. THERMOMETER, Black Bulb in Sun, Highest, (corrected for Index Errors), on the th, = 0
 "Corrected Mean," (Col. 7), of Black Bulb, Max. in Sun, = 0
 Lowest at Night, Black Bulb, (corrected for Index errors), on the th, = 0
 "Corrected Mean," (Col. 8), of Black Bulb, Min. on grass, = 0
 Difference of above Means or Range ("exposed"), = 0

HYGROMETER, Mean (corrected) A.M. and P.M. Reading of Dry Bulb, (Cols. 9 and 11), = 39.0
 Mean (corrected) A.M. and P.M. Reading of Wet Bulb, (Cols. 10 and 12), = 38.0
 ‡ Computed Temperature of Dew-Point, = 36.7
 ‡ Do. Elastic Force of Vapour, = 218
 ‡ Do. Weight of Vapour in a Cubic Foot of Air, = 0
 ‡ Relative Humidity, (Saturation = 100), = 92
 RAIN fell on 24 Days; Amount in Inches, = 2.39

* 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.
 † Embarking corrections for both capillarity and Index Errors.
 ‡ The Diurnal Range for Scotland is as yet unknown.
 ‡† These "Hygrometrical Deductions" are calculated from Glaisher's Hygrometrical Tables, Second Edition only.
 ‡‡ While the Diurnal Range is unknown, the Arithmetical Mean of Cols. 5 and 6 will be entered as the "Calculated Mean Temperature."
 Any Observations not taken under the conditions specified in the Directions on the other side, or noted at the Top of each column, must be marked as such by the observer, in each Schedule. See over.

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		5		2	4	15	4						
P.M.	2		4	2	1	2	15	5						
Mean.	1		5	1	1	3	15	6	0					

Observations made and Return verified by George W. Smyth (Signed)

SCOTTISH METEOROLOGICAL SOCIETY.

Observations taken at The Gardens at Inverurie County of Aberdeen, in Lat. _____, Long. _____, Distance from Sea 31 miles.
Height of Cistern of the Barometer above Mean Sea-level 453.3 feet, above Ground 44 feet. During the MONTH of April 1882.
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, began and ended.	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.		9 A.M.		P.M.		9 h. A.M.												
		Barometer. No.	Attached Thermometer	Barometer. No.	Attached Thermometer	Max. No.	Min. No.	Max. in Sun's rays No.	Min. on Grass. No.	Dry bulb.	Wet bulb.	Dry bulb.	Wet bulb.	Direction.	Force.	Direction.	Force.	Readings of the H. Cup Anemometer. No.	No. of hours in which it fell.	Amount in inches. No.	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.	
		inches.	°	inches.	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°					°	°	°	°
	1	29.500	47	29.700	48		32			39	39	37	37	E		E			0.13	Hi	Hi										Rainy day	1		
	2	29.750	45	29.750	48		36			41	40	36	36	E		E			0.11	Hi	Hi										"	2		
	3	29.750	49	29.750	46		36			36	36	39	39	E		E			0.04	Hi	Hi										"	3		
	4	29.800	49	29.900	49		35			44	41	35	34	E		E			—	Hi	Cu										Dry cold day	4		
	5	29.900	47	29.950	49		34			42	40	38	37	E		E			—	Cu	Cu										Forecast & cold	5		
	6	30.000	49	30.050	50		32			42	40	33	32	E		E			—	Best	Stn										Bright & cold	6		
	7	30.100	49	30.150	52		26			39	32	29	28	W		E			—	Cu	St-										Clear day	7		
	8	30.100	50	30.100	52		20			39	28	33	32	E		E			—	St-	St-										"	8		
	9	29.900	50	29.800	52		26			36	32	33	32	E		E			—	St-	St-										Heavy fog & m then bright	9		
	10	29.725	48	29.650	52		23			35	32	38	35	E		W			—	Cu	St-										Clear & cold	10		
	11	29.500	49	29.500	48		34			38	38	35	35	E		E			0.12	Hi	Hi										Gloomy & m rising Pm	11		
	12	29.450	47	29.400	46		34			49	48	34	34	E		E			0.30	Hi	Hi										Very cold & raining	12		
	13	29.250	45	28.950	45		33			35	35	33	33	E		E			1.15	Hi	Hi										Very rainy & some snow shs	13		
	14	28.850	44	29.000	44		32			35	35	34	32	E		E			0.50	Hi	Hi										Sleet & snow all day	14		
	15	29.100	43	29.250	45		25			37	34	27	27	W		W			0.03	Cu	Cu										cold & shs of snow	15		
	16	29.175	44	29.150	44		24			30	29	29	29	E		E			0.18	Sn	Cu										Very stormy thick of snow follows.	16		
	17	28.900	44	28.900	44		27			33	32	35	35	E		E			0.40	Sn	Cu										Overcast & mild	17		
	18	29.250	44	29.400	47		26			40	36	30	29	W		W			0.13	Sn	Cu											cold day	18	
	19	29.200	46	29.150	50		29			39	39	45	41	E		W			0.03	Hi	Cu										fine day some dr showers	19		
	20	29.250	50	29.500	53		40			50	45	51	47	W		W			—	St-	Cu											Spacious day	20	
	21	29.600	50	29.650	55		40			55	47	40	39	W		W			—	Cu	Best											"	21	
	22	29.400	50	29.650	54		32			43	42	44	44	E		W			0.14	Cu	Hi											fine am & rainy Pm	22	
	23	28.900	52	28.775	54		37			52	47	43	42	E		E			0.12	Best	Hi											fine & rainy & cold Pm	23	
	24	28.750	55	28.850	53		37			49	45	40	37	E		W			0.03	Best	Hi											Very cold stormy	24	
	25	28.850	52	28.900	50		36			46	43	37	36	E		W			0.11	Hi	Hi											cold & shs of snow	25	
	26	29.000	52	29.225	52		32			38	36	36	35	W		W			0.10	Hi	Hi											"	26	
	27	29.250	50	29.000	50		29			44	39	39	36	W		W			0.05	Cu	Hi											Very rainy day	27	
	28	28.800	49	28.800	51		36			43	42	40	40	E		E			0.50	Hi	St-											"	28	
	29	28.850	49	28.850	51		35			41	37	36	35	W		W			0.01	St-	St-											bright & cold	29	
	30	29.400	50	29.100	51		35			45	38	39	36	W		W			—	Cu	St-											"	30	
	31																																"	31
Sums.		10850	248	11000	295		52			34	247	208	206						2.18														NOTATION USED IN GENERAL REMARKS.	
Means.		29.362	48.3	29.370	49.5		31.7			40.1	38.2	36.8	35.8																					
† Total Corrections for Instrumental Errors.																																		
‡ Corrections for Diurnal Range.																																		
§ Corrected Means.																																		
No. of Columns.		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			

BAROMETER, "corrected Mean" at 9 A.M., minus the Correction† = 29.8
for Temp. (Col. 2), = 0.350 - 0.52
Corrected Mean" of Barometer at 9 P.M., minus the Correction† = 30.2
for Temp. (Col. 4), = 0.350 - 0.56
Mean at Station, corrected, and at 32°, = 29.300
Correction for height, feet above Mean Sea-level, = 50.3
Mean, reduced to 32°, and Sea-level, = 29.803
Highest Reading, corrected for Index error, on the 7 th, = 30.150
Lowest Do. Do., on the 24 th, = 28.750
Difference, or Monthly Range, = 1.400

S.-R. THERMOMETER, (in shade, etc.), Highest in Month, (corrected for Index Errors), on the th, =
Lowest in Month, corrected for Index errors, on the 8 th, = 20.0
Difference, or Monthly Range, =
"Corrected Mean" of all the Highest, (Col. 5), =
"Corrected Mean" of all the Lowest, (Col. 6), = 31.7
Difference, or Mean Daily Range, =
** Calculated Mean Temperature of Month, =
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), = 29.0
Mean (corrected) A.M. and P.M. Reading of Wet Bulb, (Cols. 10 and 12), = 37.0
† Computed Temperature of Dew-Point, = 34.4
† Do. Elastic Force of Vapour, =
† Do. Weight of Vapour in a Cubic Foot of Air, ... = 199
† Relative Humidity, (Saturation = 100), = 84
RAIN fell on 20 Days; Amount in Inches, = 4.18

WIND.		SUMMARY.			
Direction.		N	NE	E	SE
A.M.		2	1	5	5
P.M.		2	2	5	1
Mean.		2	1.5	3	0.3

Observations made and
Return verified by

(Signed)

George H. Smyth

WITH REMARKS ON THE USE OF INSTRUMENTS.

being 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, other Negretti and Zambra's, 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 Officers have a right to have their instruments compared by the Secretary, and to advise with him regarding the purchase of instruments.

Very great care should be bestowed on the Observations of the Wind. The accuracy of which, both as regards Direction and Force, is so essential towards the right discussion of many of the most important problems of the science. A Wind-Vane ought to be elevated at least 12 feet above surrounding objects. When it oscillates incessantly, the mean direction should be taken. In all cases, but especially when the Vane is stationary, and when the wind is feeble, reference may be made to the direction of smoke, &c., in well-exposed situations. Careful observations are recommended to be made on the changes in the direction of the wind; and during storms, exact 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* CHANGES, and other points connected with storms.

The Council would recommend the Hæmiphspherical Cup Anemometer—a self-registering instrument which shows the amount of Wind that passes it per day; from which they can also the mean Velocity of the Wind at the time of

1. As regards Direction.

2. As regards Velocity and Force.

can well-exposed situations. Until observations are recommended to be made on the changes in the direction of the wind; and during storms, exact 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 Plymouth called SOUND 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.

The Council would recommend the Hemispherical Cup Anemometer—a self-registering instrument which shows the amount of Wind that passes it per day; from which they would also the mean Velocity of the Wind at the time of

Force of the Wind at any particular hour of observation, the Pressure being ascertained. For indicating the Force of the Wind, the Anemometers recently brought under the notice of the Society by Mr T. Stevenson, the Honorary Secretary, and Mr R. Ballingall, the Society's Observer at Lallabuis, are recommended as likely to secure uniformity in making observations on the Force of the Wind.

Rain Causes 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. The rain-gauge should not be placed on a slope or terrace, but on a level piece of ground, in as open a situation as the Observer can secure for it. It is also very important to observe that the gauge is free and not affected by windmilling, or by any other such disturbing cause, and to place it at some distance from trees, hedges, buildings or other obstructions, at least as many feet from their base as they are in height. The more important directions, towards which it is most desirable to have a free exposure, are in the order of their importance, S.W., N.E., S.E., S., and W. The rim of the gauge must be perfectly level and fixed so that it will remain level in all weathers, and be at a height of 60 feet above

In such gauges as Fleming's, which are furnished with a measuring rod attached to the float, the rod ought to be fixed down, and the float rise to its height only at the time the instrument is read, it being found that a stem projecting above the rim of the gauge 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 A.M., and the reading entered in the Returns 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. Snow-falls may, for convenience, be registered in the Rain columns, under the following conditions:—When a Snow-shower occurs, it should be noted in the 'Remains', and the letter S affixed to the date of water record in Gauge.

Snow-falls.—Under the following conditions:—When a snow-shower occurs, it should be noted in the "Remarks," and the letter S affixed to the depth of water received in Gauge. And 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 indexed in every column, the Observer cannot be too careful to register observations only; and nothing that partakes of the nature of deduction or inference.

to be estimated from the greater or less observation of the sky overhead (i. e., within 20° or 30° 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 features. The amount of Cloud is entered from a scale of 0 to 10; thus, when the sky overhead is free from Clouds it is entered 0, when half covered by Clouds, 5, wholly covered, 10, and so on.

S. W. _____ will indicate that the upper strata of Clouds travel with _____ W.
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 _____^{4. st.} will indicate that the higher Cloud column, an entry of _____^{2. east.}

Cloud column, an entry of $\frac{2}{2}$, 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.

Remarks on peculiar Clouds, accompanied with drawings, will assist initially 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.

Sunshine.

Sunrise. column.
 As the germination and growth of crops and plants generally depend greatly on the temperature of the soil,—this 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 not only in itself, but in its relations 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, or from the shore, at least twice a day, at the same place, and at the same hour, if this be impracticable, from the ends of piers and rocks round the coast, where it is not influenced by that of river water, and as little influenced as possible by currents sweeping along the coast, and thus acquiring the temperature of the land. Other greatly heated by the sun or cooled by nocturnal radiation. At or near the time of high

Secretary of

BOOK POST.

EDINBURGH, *December 1880.*

OBSERVATIONS IN CONNECTION WITH THE PERIODICAL RETURN OF THE SEASONS.

FOREST TREES.		Flower.	In Leaf buds.	In Leaf.	Divested of Leaves.	CROPS.	Barley, Oats, Beans, Pease, Potatoes, Turnips, Rye Grass, &c.
Alder.
Asb.
Beech.
Birch.
Elm.
Larch.
Lime.
Oak.
Sycamore or Plane,

SHRUBS, &C.		First to Blossom.	FRUITS.	First in Blossom.	First in Fruits.	MIGNATORY KINDS.	First Arrival.	Departure.
Barberry,	Apple,	...	...	Cuckoo,	...	...
Boutée or Elder,	Black Currant,	...	...	House-Swallow,	...	...
Broom,	Cherry,	...	...	Lapwing,	...	...
Hazel,	Geen,	...	...	Plover,	...	...
Hawthorn,	Gooseberry,	...	...	Sand-Martin,	...	...
Holly,	Peach,	...	...	Starling,	...	...
Laburnum,	Pear,	...	...	Swan,	...	...
Lilac,	Plum,	...	...	Rail or Corn Crane,	...	...
Mazereau,	Strawberry,	...	...	
Mountain Ash or Rowan,						
Red Flowering Currant,						
Rhododendron Ponticum,						
Vib.						

Have the goodness also to state any information you may be able to connect relative to the crops of grain, hay, timothy, turnips, fruits, etc., whether plentiful, or in perfection; whether any have suffered from blight, disease, etc. Whether Diphotic disease prevails among cattle; and the Agricultural condition of the district generally.

SCOTTISH METEOROLOGICAL SOCIETY.

Observations taken at Abbeville County of Abbeville, in Lat. _____, Long. _____, Distance from Sea 31 miles.Height of Cistern of the Barometer above Mean Sea-level 453-3 feet, above Ground 4 feet.During the MONTH of May 1882.

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, began and ended.	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.		9 A.M.		P.M.		9 h. A.M.																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																						
		Barometer.	Attached Thermometer.	Barometer.	Attached Thermometer.	Max.	Min.	Max. in Sun's rays.	Min. on Grass.	Dry bulb.	Wet bulb.	Dry bulb.	Wet bulb.	Direction.	Force.	Direction.	Force.	No. of hours in which it fell.	Amount in inches.	Velocity (0—10), and Direction.	Amount (0—10), and Species.	Velocity (0—10), and Direction.	Amount (0—10), and Species.	No. 1.	No. 2.	No. 3.	No. 12.					No. 22.																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																												
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BAROMETER, "corrected Mean" at 9 A.M., minus the Correction for Temp. (Col. 2), = 29.520
Corrected Mean" of Barometer at 9 P.M., minus the Correction for Temp. (Col. 4), = 29.523
Mean at Station, corrected, and at 32°, = 29.522
Correction for height, feet above Mean Sea-level, = 497
Mean, reduced to 32°, and Sea-level, = 30.019
Highest Reading, corrected for Index error, on the 17 th, = 30.050
Lowest Do. Do., on the 24 th, = 28.750
Difference, or Monthly Range, = 1.300

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

Lowest in Month, corrected for Index errors, on the 10 th, = 28.0

Difference, or Monthly Range, =

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

"Corrected Mean" of all the Lowest, (Col. 6), = 35.4

Difference, or Mean Daily Range, =

** Calculated Mean Temperature of Month, =

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), = 47.3

Mean (corrected) A.M. and P.M. Reading of Wet Bulb, (Cols. 10 and 12), = 43.8

Computed Temperature of Dew-Point, = 39.4

Do. Elastic Force of Vapour, = 22.6

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

Relative Humidity, (Saturation = 100), = 77

RAIN fell on 11 Days; Amount in Inches, = 2.20

WIND.												SUMMARY.		
Direction.	N	NE	E	SE	S	SW	W	NW	Calm or Variable.	Mean Force.	Mean Velocity in miles per day.			
A.M.			16	4		2	4	3						
P.M.			12	3		1	8	2						
Mean.			12	3	0	1	6	4	0					

Observations made and
Return verified by

George D. Smyth

(Signed)

INSTRUCTIONS FOR TAKING METEOROLOGICAL OBSERVATIONS,

WITH REMARKS ON THE USE OF INSTRUMENTS.

One of the chief objects that the Scottish Meteorological Society proposed to itself when the Society was established in 1855, was to secure regularity in the system of observation pursued at all the Stations. Uniformity in the observations is absolutely necessary to justify the publication of Monthly Results from different observations, it being found that differences between the Returns from two Stations, so very considerable as to render them quite incomparable, may arise from dissimilarity in the position or shelter of the instruments, different hours of observation, or even from the use of differently constructed instruments. It is therefore hoped, that those who kindly furnish Reports to the Society will, by a scrupulous attention to the following Directions, secure for their Monthly Returns, an accuracy and value commensurate with the labour and pains involved in making them; and, for the Tables published by the Society, an entire comparableness among the several Returns, without which the Society's Reports must inevitably fail in achieving one of the main objects of Meteorological Observation.

The Council recommend that Observations be made precisely at 9 A.M. and 9 P.M. (Greenwich or Railway Time only), as specified in the following remarks, or at the top of the column of the Schedule. It is hoped that the utmost punctuality in the time of reading the instruments will be observed. Observers, in some few cases, may find this impossible; in such instances, they are specially requested to mark opposite every reading the time at which it was taken, if not at 9 A.M. or 9 P.M.

Barometer.—Roughly variations of atmospheric pressure, are not to be used for Meteorological purposes. The Barometer should be some means of adjustment or compensation which will secure the height of the mercury in the tube as exactly measured from the fluctuating surface of the mercury in this column. The Barometer in which the error is greatest, is that of Fortin's. The arrangement of the instrument, in which is made of flexible leather, the rising or falling of the surface till it just meets the ivory point, which is the zero point of the fixed scale.

The Barometer originally constructed by Mr. Adie of London, and called the Board of Trade Barometer, has the great advantage of requiring no adjustment of the cistern. Its scale-inches are not two inches, but so much shorter as to compensate the error that would otherwise arise from the fluctuations of the surface of mercury in the cistern. This is an excellent Barometer for ordinary Observers, inasmuch as it entirely eliminates the error of observation likely to arise in not a few cases in setting the instrument to the zero point of the fixed scale. When the Barometer is made, it is to be set, that one was compared, during a whole year, with the Society's Standard Barometer, particular care being given to make the comparison when atmospheric pressure was rising or falling very rapidly, with the result that none of the readings differed from those of the Standard more than 0.003 inch.

A modification of Fortin's Barometer is used at a number of the Society's Stations, by which the coincidence of the zero point with the surface of the mercury is indicated by a little ivory float, whose stem passes freely through the lid and ease of the cistern. When the index-line on this little piston-rod is brought, by the adjusting screw, to form one straight line with those on its ivory frame, the surface of the mercury is then at the exact height from which the scale is graduated. In taking an observation, this preliminary setting must be made with scrupulous accuracy; as a slight error here will vitiate the readings from the vernier.

It is absolutely necessary that the Barometer which is to be used, shall have been compared with a Standard Barometer. The Barometer should be suspended in as good a light as can be secured, and to facilitate the reading, a piece of white paper may be put behind the tube. It must be hung truly perpendicular, and exposed to direct rays of the sun, or the heat of a fire, and must not be hung against a wall heated by a fire. The object being to secure that the whole instrument, including the brass fittings, the contained mercury, and the attached Thermometer, shall be, when read, at one uniform temperature, it is evident that the best position 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 the lower edge of the vernier, which must be carefully adjusted so as to form exactly a tangent to the convex surface of the mercury in the tube. Observations must be taken quickly, so as to prevent heat from the observer's hands and person from affecting the mercury. The use of a lens will facilitate an accurate adjustment and reading of the Barometer. A mistake not infrequently made by those beginning to observe, consisting in setting the edge of the vernier to the level of the clear surface of the mercury which is in direct contact with the glass tube, must be carefully avoided.

The errors must frequently made in reading the Barometer are errors of 0.30 inch, and 0.050 inch; that is to say, instead of 29.965 inches, either 30.265 or 29.665 inches are set down—viz., as 30.265 inches, the 965 is mistaken for 275; or as 29.665 inches, the 965 is mistaken for 625. Observers in making these mistakes, particular attention is directed to the matter.

When a Barometer having adjustable surfaces has to be used, a tight plug to the cistern, thus preventing the escape of the mercury, is then screw up to the top of the tube, but it is to be within a quarter of an inch of it, and take down the instrument; it should then be carried with the cistern uppermost. 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.

As Barometers are liable to be damaged by the introduction of air into their tubes, on removal from places to place, or in 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 peg 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 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 of the mercury in the Barometer, 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 hanging up the Barometer, care must be taken to screw down the mercury in the tube before untightening the float of the cistern, for, if this be not attended to, the mercury will flow out, and the instrument be seriously damaged.

The Council of the Society recommend that the Self-Registering Thermometers, and the Dry and Wet Bulb Hygrometers, be kept in Stevenson's Lorraine-boarded Box for

Thermometers, painted white inside and outside, and Maximum Thermometers, either Negretti and Zamboni's, 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 advise with him regarding the purchase of instruments.

Very great care should be bestowed on the Observations of the Wind. Wind, the action of which, both as regards Direction and Force, is so essential towards the right discussion of many of the more important problems of the science. A Wind-Vane ought to be elevated at least 12 feet above surrounding objects. When it oscillates necessarily, the mean direction should be taken. In all cases, but especially when the Vane is stationary, and when the wind is feeble, reference may be made to the direction of smoke, etc., to be made on the changes in the direction of the wind, and to the storms, extra observations to 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 study of the phenomena of the atmosphere.

1. As regards Direction. The Society's Standard Stations, on the coast of being established by the Society, the system of investigation of the relation of the force of the wind to the Barometer. The Council will recommend the Homespoken Cup Anemometer—a self-registering instrument which shows the amount of Wind that passes it per day; from which also the mean Velocity of the Wind at the time of the observation may be ascertained. For indicating the Force of the Wind at any particular hour of observation, the Pressure Anemometer recently brought under the notice of the Society by Mr. T. Stevenson, the Honorary Secretary, and Mr. R. Ballingall, the Society's Observer at Edinburgh, are recommended as the most 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 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 terrace, but on a level piece of ground, in as open a situation as the Observer can secure for it. As it is often difficult to obtain a position as free and unobstructed by surrounding objects as is desirable, care should be taken to place it at some distance from shrubs, trees, buildings, or other obstructions, at least as many feet from their base as they are in height. The more important directions, towards which it is most desirable to have a free exposure, are in the order of their importance, S.W., N.E., S.E., S., and W. The rain of the 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 Fleming's, which are furnished with a measuring rod attached to a float, the rod ought to be fixed down, and the float rise to its height only at the time the instrument is read, it being found that a stem projecting above the rim of the Gauge 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 A.M., and the reading entered in the Returns 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.

Snow-falls may, for convenience, be registered in the rain columns, under the following conditions:—When a Snow-slower occurs, it should be noted in the 'Remarks,' and the letter S affixed to the depth of water received in 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 indicated in every column, the Observer cannot be too careful to register observations only; and nothing that pertains of the nature of deduction or inference.

Convenient abbreviations for the non-climate of Clouds will be found on the other side. The amount of Cloud ought to be estimated from the greater or less obscuration of the sky overhead (i.e., within 20° or 30° 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 Cloud is entered from a scale of 0 to 10; thus, when the sky overhead is free from Clouds it is entered 0, when half covered by Clouds, 5, wholly covered, 10, and so on.

Observations of the Clouds are made at 9 A.M. and at sunset, as illustrating the condition and currents of the upper and lower regions of the atmosphere. The entries in the schedule are to be made in the following manner:—Thus, in the column Velocity and Direction, 9, S.W. 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 Cloud column, an entry of 2, east, will indicate that the higher regions are covered to the amount of 4 tenths with stratus Clouds; and that the sky is further observed to the extent of 2 tenths by lower Clouds of the cumulo stratus kind.

Remarks on peculiar Clouds, accompanied with drawings, will 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—is amount and quantity—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 not only in itself, but in its relations 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, or if this be impracticable, from the ends of piers and rocks round the coast, where it is not influenced by that of river water, and as little influenced as possible by currents sweeping along the coast, and thus acquiring the temperature of the land, either greatly heated by the sun or cooled by nocturnal radiation. At or near the time of high

water, in cases where the observations cannot be taken daily, the observation may be made on the 6th, 16th, and 26th of each month. When convenient, extra Sea Observations might be taken for other and greater depths, nothing always the Temperature of the Air, and the Hour of Observation. It is also very desirable that observations on the daily Maxima and Minima by Thermometers continuously immersed, be instituted at points along the coast, by the method proposed by Mr. T. Stevenson, and already commenced at Peterhead and Liverpool.

The Temperature of the water at the bottom of Wells ought, when practicable, to be taken, both the depth of the Well and of the water being noted.

Mention what Test-Papers are used, Schlotheim's or Meffert's, etc. The Paper is directed by a pin to a board in the T. Thermometer box, and the indications registered at 9 A.M. and 9 P.M.

It is tested that these indications be registered at the connection with the force and direction of the wind at the time of observation, in the following manner:—thus 3rd S.W., as an example, in the schedule will indicate that the Onne Paper is tilted as 3 on the scale, that the wind is from the N.W., and that its force on the sail 0-6 is 4, or blowing fresh.

Too much importance cannot be attached to the electric condition of the atmosphere in connection with terrestrial magnetism, barometrical, thermometrical, and meteorological phenomena generally. A proper Electrometer is, in truth, necessary to every complete meteorological observatory. The Remarks column is available for recording those observations which, for which, no rules can be given, but which are assigned. The use of contrivances, such as the Rain-Gauge, every advantage of and a list of such as are in general use are given at the foot of the column. Besides special and extraordinary Observations, great prominence ought to be given in this column to Prevailing Diseases, differences in character, colour, velocity, and direction between the Lower and Upper Strata of Clouds, the Colour of the Sky, etc. Remarks ought to be made on the occurrence of Meteors, Auroræ Boreales, remarkable depressions, elevations, and fluctuations of the Barometer, Thunderstorms, and remarkable falls of Snow, Hail, or Rain, the Hour of Storms of Wind commencing, attaining their maximum, and ending, as well as such notes on Storms as have been limited at above. When lofty hills are in the vicinity of a Station, the Height of Clouds and of the Snow-line in winter should be recorded.

By the use of abbreviations, the state of the weather at 9 A.M. and 9 P.M. should be registered either in two columns, otherwise uncoupled, or ruled off for the purpose, from the column of 'Remarks.' Observations in connection with the Periodic Return of the Seasons, possess not only great scientific value, but are of considerable importance in connection with the Meteorological Secretary, in order that every instrument may be examined and improved before being used; and they consider it necessary that he should have full power to reject any instrument which, on being presented for comparison, does not afford him satisfaction.

(By Order)

A. R.

Enclosure, December 1880.

The Council recommend Observers, before purchasing new instruments, and in replacing old ones, to communicate with the Meteorological Secretary, in order that every instrument may be examined and improved before being used; and they consider it necessary that he should have full power to reject any instrument which, on being presented for comparison, does not afford him satisfaction.

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Observations in connection with the Periodic Return of the Seasons, possess not only great scientific value,

The Hours of Observation are of Greenwich Time.

Observations made and
Return verified by

(Signed)

SCOTTISH METEOROLOGICAL SOCIETY.

Observations taken at Abeyre Castle, County of Abeyre, in Lat. _____, Long. _____, Distance from Sea 31 miles.
Height of Cistern of the Barometer above Mean Sea-level 453.3 feet, above Ground 4 feet. During the MONTH of July 1882.
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.		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.		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/rays No. —	Min. on Grass. No. —	Dry bulb. No. —	Wet bulb. No. —	Dry bulb. No. —	Wet bulb. No. —	Direction. No. —	Force. No. —	Direction. No. —	Force. No. —	Readings of the H. Cup Anemometer. No. —	No. of hours in which it fell.	Amount in inches. No. —	Velocity (0—6), and Direction.	Amount (0—10), and Species.	Velocity (0—6), and Direction.	Amount (0—10), and Species.	No. — 8 inches. 12 inches. 22 inches.																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																														
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BAROMETER, "corrected Mean" at 9 A.M., minus the Correction†† = 29.213
for Temp. (Col. 2), = 30.4 — 0.91 — 29.213
Corrected Mean" of Barometer at 9 P.M., minus the Correction†† = 29.242
for Temp. (Col. 4), = 30.4 — 0.91 — 29.242
Mean at Station, corrected, and at 32° = 29.213
Correction for height, feet above Mean Sea-level, = 4.84
Mean, reduced to 32°, and Sea-level, = 29.697
Highest Reading, corrected for Index error, on the th, = 29.675
Lowest Do. Do. on the th, = 29.950
Difference, or Monthly Range, = 1.275

S.-R. THERMOMETER, (in shade, etc.), Highest in Month, (corrected for Index Errors), on the th, = 29.9
Lowest in Month, corrected for Index errors, on the 25th, = 27.0
Difference, or Monthly Range, = 3.0
"Corrected Mean" of all the Highest, (Col. 5), = 29.2
"Corrected Mean" of all the Lowest, (Col. 6), = 27.0
Difference, or Mean Daily Range, = 2.2
** Calculated Mean Temperature of Month, = 28.2
S.-R. THERMOMETER, Black Bulb in Sun, Highest, (corrected for Index Errors), on the th, = 30.0
"Corrected Mean," (Col. 7), of Black Bulb, Max. in Sun, = 30.0
Lowest at Night, Black Bulb, (corrected for Index errors), on the th, = 27.0
"Corrected Mean," (Col. 8), of Black Bulb, Min. on grass, = 27.0
Difference of above Means or Range ("exposed"), = 3.0

HYGROMETER, Mean (corrected) A.M. and P.M. Reading of Dry Bulb, (Cols. 9 and 11), = 55.0
Mean (corrected) A.M. and P.M. Reading of Wet Bulb, (Cols. 10 and 12), = 52.7
†† Computed Temperature of Dew-Point, = 50.5
†† Do. Elastic Force of Vapour, = 3.67
†† Do. Weight of Vapour in a Cubic Foot of Air, = 8.1
†† Relative Humidity, (Saturation = 100), = 81
RAIN fell on 26 Days; Amount in Inches, = 2.98

WIND.		SUMMARY.									
Direction.	N	NE	E	SE	S	SW	W	NW	Calm or Variable.	Mean Force.	Mean Velocity in miles per day.
A.M.			4	7		11	22				
P.M.			6	8		8	6	3			
Mean.			5	8	0	10	8	2	6	~	

SCOTTISH METEOROLOGICAL SOCIETY.

Observations taken at Oban Castle, County of Aberdeen, in Lat. _____, Long. _____, Distance from Sea 31 miles.Height of Cistern of the Barometer above Mean Sea-level 453.3 feet, above Ground 4 feet.During the MONTH of August 1882.

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, began and ended.		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	9 h. A.M.	Velocity (0—10), and Direction.			Amount (0—10), and Species.	Velocity (0—10), and Direction.	Amount (0—10), and Species.	No. 3 inches.	12 inches.	No. 22 inches.																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																						
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—	No. —	No. —	No. —	No. —	No. —	No. —	No. —	No. —	No. —	No. —	No. —	No. —	No. —	No. —	No. —	No. —	No. —	No. —	No. —	No. —	No. —	No. —	No. —	No. —

BAROMETER, "corrected Mean" at 9 A.M., minus the Correction†† = 29.7
for Temp. (Col. 2), = 3.99 - 0.3 = 3.69
Corrected Mean" of Barometer at 9 P.M., minus the Correction†† = 3.09
for Temp. (Col. 4), = 4.09 - 0.91 = 3.18
Mean at Station, corrected, and at 32° = 29.300
Correction for height, feet above Mean Sea-level, = 48.5
Mean, reduced to 32°, and Sea-level, = 29.784
Highest Reading, corrected for Index error, on the th, = 29.850
Lowest Do. Do., on the th, = 28.800
Difference, or Monthly Range, = 1.050

S.-R. THERMOMETER, (in shade, etc.), Highest in Month, (corrected for Index Errors), on the th, = 58.57
Lowest in Month, corrected for Index errors, on the th, = 38.0
Difference, or Monthly Range, = 20.57
"Corrected Mean" of all the Highest, (Col. 5), = 58.57
"Corrected Mean" of all the Lowest, (Col. 6), = 45.1
Difference, or Mean Daily Range, = 13.47
** Calculated Mean Temperature of Month, = 51.83

S.-R. THERMOMETER, Black Bulb in Sun, Highest, (corrected for Index Errors), on the th, = 76.55
"Corrected Mean," (Col. 7), of Black Bulb, Max. in Sun, = 76.55
Lowest at Night, Black Bulb, (corrected for Index errors), on the th, = 48.46
"Corrected Mean," (Col. 8), of Black Bulb, Min. on grass, = 48.46
Difference of above Means or Range ("exposed"), = 28.09

HYGROMETER, Mean (corrected) A.M. and P.M. Reading of Dry Bulb, (Cols. 9 and 11), = 56.8
Mean (corrected) A.M. and P.M. Reading of Wet Bulb, (Cols. 10 and 12), = 53.6
†† Computed Temperature of Dew-Point, = 50.6
†† Do. Elastic Force of Vapour, = 370
†† Do. Weight of Vapour in a Cubic Foot of Air, = 80
†† Relative Humidity, (Saturation = 100), = 80
RAIN fell on 18 Days; Amount in Inches, = 1.55

WIND.		SUMMARY.					
Direction.	N	NE	E	SE	S	SW	W
A.M.		1	3	4	3	19	1
P.M.			4	5	6	14	2
Mean.	0	0	4	4	0	5	17

(Signed)

George D. SmithObservations made and
Return verified by

FOREST 1	OBSERV
Alder,	•
Asb,	•
Beech,	•
Birch,	•
Elm,	•
Larch,	•
Lime,	•
Oak,	•
Sycamore	•

The Hours of Observation are of Greenwich Time.

(Signed) George W. Myrba

Observations made and
Return verified by

SCOTTISH METEOROLOGICAL SOCIETY.

Observations taken at Abegwe Castle, County of Aberdeen, in Lat. _____, Long. _____, Distance from Sea 31 miles.Height of Cistern of the Barometer above Mean Sea-level 453.8 feet, above Ground 4 feet.During the MONTH of October 1882.

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.		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. of hours in which it fell.	Amount in inches.	Velocity (0-10), and Direction.	Amount (0-10), and Species.	Velocity (0-10), and Direction.	Amount (0-10), and Species.	9 h. A.M.								
		Barometer. No.	Attached Thermometer.	Barometer. No.	Attached Thermometer.	Max. No.	Min. No.	Max. in Sun's rays. No.	Min. on Grass. No.	Dry bulb.	Wet bulb.	Dry bulb.	Wet bulb.	Direction.	Force.	Direction.	Force.								No. 3 inches.	No. 12 inches.					No. 22 inches.		
																																No.	No.
		inches.	°	inches.	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°
1	29.150	55	29.150	59	35					33	32	36	34	W	10					0.03	Cu	Cu										1	
2	29.100	58	28.800	58	40					49	49	50	50	W	Sw					0.01	ni	ni										2	
3	29.300	58	29.200	58	42					41	40	42	42	Sw	Sw					0.07	Cu	ni										3	
4	29.600	59	29.750	60	43					49	46	48	46	Sw	Sw					0.01	Cu	Cu										4	
5	29.900	58	30.200	59	48					50	49	41	40	S	W					0.02	ni	Cu										5	
6	30.250	58	30.250	58	37					48	47	48	47	Sw	8					0.03	St	St										6	
7	30.200	58	30.100	57	37					47	47	47	47	E	8					0.06	ni	ni										7	
8	29.800	58	29.800	58	45					52	52	48	46	E	8					0.08	ni	ni										8	
9	29.700	59	29.650	65	45					50	50	46	46	E	8					0.16	ni	ni										9	
10	29.500	59	29.450	62	37					50	50	48	47	Sw	Sw					0.18	ni	Cu										10	
11	29.250	59	29.050	63	45					52	57	48	48	E	8					0.22	Cu	ni										11	
12	29.225	61	29.400	63	47					50	49	49	46	E	8					0.48	ni	ni										12	
13	29.600	63	29.700	63	47					52	51	48	48	E	8					0.04	ni	ni										13	
14	29.600	62	29.650	64	45					48	47	49	48	E	8					0.03	ni	ni										14	
15	29.400	62	29.400	62	45					49	47	45	44	E	8					0.10	ni	ni										15	
16	29.500	60	29.550	62	42					45	44	42	42	E	8					0.20	ni	ni										16	
17	29.600	62	29.750	62	34					44	44	36	35	E	8					0.43	ni	ni										17	
18	29.800	62	29.650	60	32					43	42	45	45	E	8					0.22	ni	ni										18	
19	29.400	60	29.250	60	34					49	47	45	45	E	8					0.01	ni	ni										19	
20	29.200	60	29.200	60	34					50	49	46	44	E	8					0.24	Cu	ni										20	
21	29.100	62	28.850	60	34					49	48	42	42	E	8					0.40	Cu	ni										21	
22	28.700	59	28.700	61	37					39	38	39	37	W	8					—	St	Cu										22	
23	28.700	59	28.800	62	32					39	37	35	34	Sw	W					—	St	Cu										23	
24	28.900	52	28.900	54	28					36	35	35	34	W	W					—	St	Cu										24	
25	29.000	53	29.050	50	33					40	39	36	35	W	W					—	Cu	St										25	
26	29.150	53	29.150	54	30					32	31	40	39	W	W					—	St	St										26	
27	29.400	53	29.450	52	30					34	33	36	35	W	W					0.01	Cu	Cu										27	
28	29.550	55	29.550	49	33					40	39	38	37	W	W					0.01	Cu	Cu										28	
29	29.400	48	29.350	50	29					34	33	30	29	W	W					—	Cu	Cu										29	
30	29.150	50	29.150	48	27					32	31	33	32	W	W					—	Cu	Cu										30	
31																																	31
Sums.		1412.5	139	1190	135	220				146	105	71	44							282													
Means.		29.404	57.8	29.397	58.4	37.3				44.9	43.5	42.4	41.5																				
† Total Corrections for Instrumental Errors.																																	
† 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		

BAROMETER, “corrected Mean” at 9 A.M., minus the Correction†† = 29.315
for Temp. (Col. 2), = 3.92 — 0.77 }
Corrected Mean” of Barometer at 9 P.M., minus the Correction†† = 29.306
for Temp. (Col. 4), = 3.85 — 0.79 }
Mean at Station, corrected, and at 32°, = 29.310
Correction for height, feet above Mean Sea-level, = 498
Mean, reduced to 32°, and Sea-level, = 29.808
Highest Reading, corrected for Index error, on the 6 th, = 30.250
Lowest Do. Do., on the 22 th, = 28.700
Difference, or Monthly Range, = 1.550

S.-R. THERMOMETER, (in shade, etc.), Highest in Month, (corrected for Index Errors), on the 30 th, = 27
Lowest in Month, corrected for Index errors, on the 50 th, = 27.0
Difference, or Monthly Range, = —
“Corrected Mean” of all the Highest, (Col. 5), = —
“Corrected Mean” of all the Lowest, (Col. 6), = 37.3
Difference, or Mean Daily Range, = —
** Calculated Mean Temperature of Month, = —
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), = 43.6
Mean (corrected) A.M. and P.M. Reading of Wet Bulb, (Cols. 10 and 12), = 42.5
†† Computed Temperature of Dew-Point, = 41.2
†† Do. Elastic Force of Vapour, = 2.59
†† Do. Weight of Vapour in a Cubic Foot of Air, = —
†† Relative Humidity, (Saturation = 100), = 91
RAIN fell on 27 Days; Amount in Inches, = 28.2

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			14	4	1	8	1				
P.M.	2			16	2	2	8					
Mean.	1	0	15	3	0	2	8	1	0	—		

Observations made and
Return verified by

(Signed)

Geo H Smythe

SCOTTISH METEOROLOGICAL SOCIETY.

Observations taken at Gardens Abbey Castle, County of Perthshire, in Lat. _____, Long. _____, Distance from Sea 31 miles.Height of Cistern of the Barometer above Mean Sea-level 153.3 feet, above Ground 4 feet.During the MONTH of November 1882.

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, began and ended.	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.	No. —	9 A.M.		P.M.		SUNSHINE. Hours.	9 h. A.M.					Temperature of Well at depth of feet. No.	Temperature at 1 fathom, and Density.	0—10. 9 A.M. 9 P.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				9 h. A.M.	Velocity (0—10), and Direction.	Amount, (0—10), and Species.	Velocity (0—10), and Direction.		Amount, (0—10), and Species.								No. 3 inches.	No. 12 inches.	No. 22 inches.		
inches.	°	inches.	°	°	°	°	°	°	°	°	°	°																										
1	29.200	49	29.400	48	27					42	38	32	31	W	14	W					St-	Cu									Fine day	1						
2	29.150	49	28.850	50	30					39	38	29	37	E	8	E		0.21			Mi	Mi									Rainy day	2						
3	28.900	50	29.000	50	35					40	39	45	43	SE	28	SE		0.40			Mi	Cu									Fine am Rainy Pm lightning at night	3						
4	28.700	50	28.600	50	35					42	40	40	39	SW	26	SE		0.60			Cu	qi									" " " " high wind at night	4						
5	28.800	50	28.850	49	35					41	40	41	40	W		W		0.50			Cu	Cu									Fine day high wind at night	5						
6	29.000	49	29.050	50	37					44	41	38	37	NW		NW		0.01			St-	St-									Rainy day Clear night shooting stars	6						
7	29.300	50	29.350	47	27					45	43	29	37	W		W		0.50			St-	Cu										Fine day rainy night	7					
8	29.400	50	28.700	47	22					27	30	38	37	W		E		0.86			St-	Mi									" " Snow "	8						
9	28.600	50	28.400	50	31					38	38	36	36	SE		E		0.02			Mi	Cu									Rainy am high hills white snow	9						
10	28.550	46	28.800	46	32					34	34	38	36	NW		W		—			Cu	St-									Fine day	10						
11	28.950	45	29.150	49	31					38	34	34	33	N		NW		0.01			Cu	St-									Fine day some sleet at night	11						
12	29.400	49	29.500	48	31					40	39	35	33	NW		W		0.01			Cu	Mi									" " " " " "	12						
13	29.650	45	29.750	47	28					32	31	32	31	NW		NW		—			Cu	Cu									Fine but overcast	13						
14	29.800	44	29.850	45	27					31	30	29	28	E		W		—			Cu	Cu									Fine day	14						
15	29.850	43	29.700	44	24					29	28	27	24	SE		E		—			Cu	Cu									overcast all day	15						
16	29.500	45	29.150	45	31					35	32	36	35	SE		E		0.36			Mi	Mi									Rainy day Gale at night	16						
17	29.250	45	29.550	44	28					37	35	30	32	W		SE		0.17			Mi	Cu									Rain hail & snow all day	17						
18	29.550	45	29.450	44	18					32	31	33	31	N		W		0.03			Mi	Cu										Snow Rainy morning Very red sky at night	18					
19	29.200	42	28.850	43	29					35	33	35	34	E		SE		0.30			Mi	Mi									Rainy day & sleet	19						
20	28.700	40	28.700	41	25					32	32	28	27	W		NW		—			Cu	Cu									Fine day	20						
21	28.800	40	29.100	43	23					35	35	29	29	NW		NW		0.03			Cu	Cu									Fine am showing at night	21						
22	29.275	42	29.225	43	30					36	35	34	33	NW		W		0.62			Mi	Mi									" " " " " "	22						
23	29.700	43	28.800	45	32					34	34	42	40	SE		NW		0.10			Mi	Cu										Rainy day	23					
24	28.800	46	28.550	41	35					38	37	41	41	NW		NW		0.03			Mi	Mi										" " " " " "	24					
25	28.650	46	28.500	45	31					37	37	32	32	SE		W		—			Cu	Cu										Bright day through round moon	25					
26	29.450	43	28.450	45	30					33	32	34	33	W		W		—			Cu	Cu										Fine day	26					
27	28.600	46	28.950	47	30					35	34	35	35	SE		NW		0.40			Mi	Mi										Heavy sleet of snow	27					
28	29.100	45	29.200	43	30					31	31	36	35	W		NW		0.26			Cu	Mi										" " " " " "	28					
29	29.600	43	29.550	42	28					32	31	29	28	NW		W		0.05			Cu	Cu										overcast and very cold	29					
30	29.300	43	29.650	45	28					33	33	35	35	NW		W		0.22			Cu	Mi										sleet of rain & snow	30					
31																																						
Sums.	155	17	2575	176	280					17	155	152	126					54	569														NOTATION USED IN GENERAL REMARKS.					
Means.	29.090	45.5	29.086	45.9	29.3					359	352	351	342																					a. denotes aurora.	in. denotes meteor.			
† Total Corrections for Instrumental Errors.																																		ci. " cirrus.	ms. " meteors.			
† Corrections for Diurnal Range.																																		ci-cu. " cirro-cumulus.	n. " nimbus.			
"Corrected Means."																																		ci-s. " cirro-stratus.	r. " rain.			
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			cu. " cumulus.	h. r. " heavy rain.				
																																		cu-s. " cumulo-stratus.	c. h. r. " continued heavy rain.			
																																		d. " dew.	s. " stratus.			
																																		f. " fog.	sc. " scud.			
																																		fr. " frost.	s. " sleet.			
																																		h.-fr. " hoar-frost.	s. " snow.			
																																		h. " haze.	so. h. a. " solar halo.			
																																		h. d. " heavy dew.	sq. " squall.			
																																		hl. " hail.	sgs. " squalls.			
																																		l. " lightning.	t. " thunder.			
																																		li. cl. " light clouds.	t. s. " thunder storm.			
																																		li. sh. " light showers.	w. " wind.			
																																		li. co. " lunar corona.	g. " gale of wind.			
																																		li. h. " lunar halo.				
																																	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	Light breeze	4	Blowing hard
																																	0.5	Very light air	2	Fresh breeze	5	Blowing a gale
																																	1	Light air	3	Very fresh	6	Violent gale

BAROMETER, "corrected Mean" at 9 A.M., minus the Correction†† = 29.035
for Temp. (Col. 2), = 0.79 — 0.44 —
Corrected Mean" of Barometer at 9 P.M., minus the Correction†† = 29.029
for Temp. (Col. 4), = 0.74 — 0.45 —
Mean at Station, corrected, and at 32°, = 29.032
Correction for height, feet above Mean Sea-level, = 0.503
Mean, reduced to 32°, and Sea-level, = 29.535
Highest Reading, corrected for Index error, on the 15th, = 29.850
Lowest Do. Do., on the 9th, = 28.400
Difference, or Monthly Range, = 1.450

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

Lowest in Month, corrected for Index errors, on the 18th, = 18.0

Difference, or Monthly Range, =

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

"Corrected Mean" of all the Lowest, (Col. 6), = 29.3

Difference, or Mean Daily Range, =

** Calculated Mean Temperature of Month, =

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), = 35.5Mean (corrected) A.M. and P.M. Reading of Wet Bulb, (Cols. 10 and 12), = 34.7†† Computed Temperature of Dew-Point, = 33.25†† Do. Elastic Force of Vapour, = 4.19193

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

†† Relative Humidity, (Saturation = 100), = 93RAIN fell on 22 Days; Amount in Inches, = 5.69

WIND.		SUMMARY.				
Direction.	N	NE	E	SE	S	SW
A.M.	2	3	3	5		16
P.M.	2	1	5	3		10
Mean.	2	2	4	4	0	8

(Signed)

George S. Smyth

Observations made and
Return verified by

SCOTTISH METEOROLOGICAL SOCIETY.

Observations taken at *Abdoyne Castle Gardens* County of *Aberdeen*, in Lat. _____, Long. _____, Distance from Sea *31* miles.Height of Cistern of the Barometer above Mean Sea-level *457.3* feet, above Ground *4* feet.During the MONTH of *December* 1882.

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, began and ended.		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.		9 A.M.		P.M.		9 h. A.M.														
		Barometer. * No.	Attached Thermometer	Barometer. No.	Attached Thermometer	Max. No.	Min. No.	Max. in Sun's rays No.	Min. on Grass. No.	Dry bulb.	Wet bulb.	Dry bulb.	Wet bulb.	Direction.	Force.	Direction.	Force.	Readings of the H. Cup Anemometer. No. —	9 h. A.M.	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.	No. 12 inches.	No. 22 inches.	Temperature of Well, at depth of 18 in.	Temperature at 1 fathom, and Density.	9 A.M.	9 P.M.				
		inches.	°	inches.	°	°	°	°	°	°	°	°	°																							
	1	29.550	38	29.500	39	21				24	22	25	22	W		N																overcast and cold	1			
	2	29.350	38	28.900	40	20				34	32	33	33	SE		SE		0.18															Cold and rainy	2		
	3	28.750	43	28.600	40	28				41	40	30	29	SE		SW																	overcast — all day clear night	3		
	4	28.550	43	28.850	40	25				31	30	29	28	SE		NE		0.10															snowing all — 3 inches deep	4		
	5	29.100	40	29.200	38	20				28	27	20	20	NE		NE		0.25															blue snow & still snowing	5		
	6	29.200	37	29.150	36	11				23	22	15	14	NE		NE		0.40																heavy snow of snow	6	
	7	29.200	36	29.200	38	14				25	25	20	20	NE		NE		0.20																heavy fall of snow 10 inches deep	7	
	8	29.200	37	29.200	37	16				24	24	20	20	NE		NE		0.20																overcast and snowing	8	
	9	29.200	36	29.200	39	11				37	26	32	32	NE		N		0.40																15 inch snow lightning at night snow all day	9	
	10	29.250	28	29.250	28	18				26	31	21	20	W		W		—																Red sunrise & sunset foggy all day	10	
	11	29.200	35	29.250	23	-2	below zero			16	10	2	2	W		W		—																misty and very cold	11	
	12	29.250	30	29.250	34	-2	" " "			12	12	10	10	W		W		—																Lightning at night overcast & snowing	12	
	13	29.350	32	29.400	32	25				11	11	12	12	W		W		—																Piercing cold all day	13	
	14	29.450	26	29.450	30	-2	below zero			5	12	12	12	W		W		0.10																overcast & cold a.m. but milder p.m.	14	
	15	29.500	33	29.400	38	18				35	35	38	37	NE		SE		1.00																fresh & rainy all day	15	
	16	29.300	40	29.400	43	34				39	39	40	40	E		SE		0.10																cloud and rainy all day	16	
	17	29.500	40	29.650	41	35				34	29	39	39	E		SE		0.08																" " " " " "	17	
	18	29.600	43	29.200	46	34				39	39	43	42	SE		E		0.01																" " " " " "	18	
	19	29.000	44	29.000	45	34				39	37	38	37	W		W		0.02																fine a.m. rainy p.m.	19	
	20	28.900	43	28.800	44	32				32	32	35	33	W		W		0.04																" " " " " "	20	
	21	29.000	40	29.150	41	28				30	30	30	30	W		W		0.03																" " " " " "	21	
	22	29.150	38	29.150	35	21				29	28	25	24	E		E		0.02																some snow of sleet	22	
	23	29.050	39	28.950	38	21				34	32	28	26	W		W		0.01																1 inch of snow fell today	23	
	24	29.050	38	29.100	38	20				29	29	23	22	W		W		—																	fine day	24
	25	28.850	38	28.600	40	18				33	32	43	40	SE		W		0.08																	Heavy fall of snow since last m. at 16 in	25
	26	28.800	40	29.950	44	32				41	40	34	33	W		W		0.40																	fine day rain at night	26
	27	28.750	42	29.000	42	30				33	33	31	30	W		W		0.50																	rain & snow	27
	28	29.300	40	29.400	40	26				33	30	31	31	W		W		0.25																	overcast — all day	28
	29	29.400	42	29.250	42	28				37	36	30	28	W		W		—																	rainy day	29
	30	28.975	41	28.900	40	29				38	38	31	31	W		W		0.01																	cloud & overcast	30
	31	29.100	40	29.200	40	31				37	37	32	31	W		W																			" " " " " "	31
	Sums.	5025	261	4700	281	10				10915	10	23	208					34																		NOTATION USED IN GENERAL REMARKS.
	Means.	29.162	38.4	29.152	39.1	21.1				303	289	27.5	267																							
	† Total Corrections for Instrumental Errors.																																			
	† Corrections for Diurnal Range.																																			
	"Corrected Means."																																			
	No. of	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					

BAROMETER, "corrected Mean" at 9 A.M., minus the Correction $\dagger\dagger$ for Temp. (Col. 2), = 29.124
Corrected Mean " of Barometer at 9 P.M., minus the Correction $\dagger\dagger$ for Temp. (Col. 4), = 29.113
Mean at Station, corrected, and at 32°, = 29.118
Correction for height, feet above Mean Sea-level, = 571
Mean, reduced to 32°, and Sea-level, = 29.629
Highest Reading, corrected for Index error, on the 17 th, = 29.650
Lowest Do. Do., on the 25 th, = 28.600
Difference, or Monthly Range, = 1.050

* 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.
† The Diurnal Range for Scotland is as yet unknown.
†† Practically, though not absolutely a minus correction.
‡ These "Hygrometrical Deductions" are calculated from Glaisher's Hygrometrical Tables, Second Edition only.
‡‡ While the Diurnal Range is unknown, the Arithmetic Mean of Cols. 5 and 6 will be entered as the "Calculated Mean Temperature."
‡‡‡ Observations not taken under the conditions specified in the Directions on the other side, or noted at the Top of each column, must be marked as such by the observer, in each Schedule. See over.

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

Lowest in Month, corrected for Index errors, on the th, = -20

Difference, or Monthly Range, = 20

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

"Corrected Mean" of all the Lowest, (Col. 6), = 21.1

Difference, or Mean Daily Range, =

** Calculated Mean Temperature of Month, =

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), = 28.9

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

10 and 12), = 27.8

†† Computed Temperature of Dew-Point, = 23.8

† Do. Elastic Force of Vapour, = 128.27

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

†† Relative Humidity, (Saturation = 100), = 87

RAIN fell on 22 Days; Amount in Inches, = 4.20

WIND.		SUMMARY.					
Direction.		N	NE	E	SE	S	SW
A.M.			6	3	5		7
P.M.			2	5	2	4	1
Mean.			1	6	2	5	0

Observations made and
Return verified by

(Signed)

George H. Smith

OBSERVATIONS,

setting of the scale of every instrument; the rejection of Thermo-
meters, 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 Zanussi's, 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
very great care must be bestowed on the Observations of the
instruments with him regarding the purchase of instruments.

Wind, the accuracy of which, both as regards Direc-
tion and Force, is so essential towards the right
discussion of many of the more important problems of the science.
A Wind-Vane might be elevated at least 12 feet above sur-
rounding objects. When it oscillates incessantly, the
mean direction should be taken. In all cases, but
especially when the Vane is stationary, and when the
force may be such as to change the direction of smoke, &c.,
well-exposed situations. Careful observations are recommended
to be made on the changes in the direction of the wind; and during
storms, exact 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
a connection with the system of thickly-planted Stations over a
limited district round Pittsburgh called Storm Stations, the in-
vestigation of being established by the Society for the systematic in-
vestigation of the relation of the force of the wind to Barometric
pressures, and other points connected with storms.

The Council would recommend the Hemisphere Cup Anemo-
meter, a self-registering instrument which shows the
amount of Wind that passes it per day; from which
also the mean Velocity of the Wind at the time of

1. As regards
Direction.

2. As regards
Force.

Fortunately, Spirit Thermometers may be easily set right by any one, and the column of spirit changes to separate. Let the Thermometer be taken in the hand by the end farthest from the bulb, and the bulb being held above the head, and then slowly swung down towards the eye the object being on the principle of centrifugal force, the column of spirit will be thrown to the side, and the column of water will even the detached portion of spirit, which, being turned down towards the bulb, will condense on the surface of the unbroken column of spirit. Care must be taken, thus, that the heat is not applied too quickly; if, on the contrary, the heat is applied too slowly, the spirit will not be thrown to the side, and the column of water will be too long. The best way to supply the requisite amount of heat is to lay the bulb of the thermometer against the side of the hand, and to draw the hand slowly towards a flame from a gas-burner; or, if gas be not at hand, a piece of tallow will serve instead.

The bulbs of the Thermometers for registering the greatest heat from the sun's rays, and the least from radiation

Black-balls During night, have black coating, which may easily be made, or mended, by the application of a mixture of lampblack and printer's ink. They are placed in shallow lacquered boxes, whose sides protect the balls from the wind. The maximum should be freely exposed to the sun, and the Minimum should rest on wooden supports a few inches from the surface of the grass, in an open situation. Snow must not be allowed to cover either of these Thermometers. Nor the sun's heat to affect the Maximum Thermometer by distillation. Black-balls enclosed in glass jackets must also be used, being indeed 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 a sufficiently advanced state to warrant the exclusive recommendation of any one of these methods.

The Hygrometer in use at the Society's Stations consists of two Thermometers, the upper bulb of which is not necessarily mounted in a glass globe, but is exposed to the atmosphere, and the lower bulb, as apparently slight deviations from the approved form of this apparatus seriously vitiate the Hygrometrical Observations. Observers are specially requested to extend to at least an inch from the scales and frame to hang down or attach, the frame must be such as will bring the tubes forward by at least an inch from any board on which it may be suspended; the water-bulb must be covered, and altogether placed to the side, and a little removed from the thermometer, so that the bulb may be of medium thickness, and fastened at the neck of the thermometer by the cotton, which also supplies it with water. It must be seen by the Observer that the mixture is always clear and moistened by the pure air. In frosty weather, the thermometer is not used, but is removed, in frosty weather, with great care. The bulb must be immersed in a mass of snow, or in a mixture of snow and water, for a minimum from 15 to 30 minutes before the hour of observation, and the thermometer must be held in the hand, and exposed as from the moist cloth in ordinary circumstances.

In reading the Thermometer careful care must be taken to

bring the eye exactly opposite the tip of the index or column of mercury. The reading ought to be taken to tenths of a degree, and noted in decimals. Thus, if the Thermometer will be read -39.9° , 40.0° , or 40.1° ; or again, 40.4° , 40.5° , 40.6° , according as it indicates a little under, an exact coincidence with, or a little over 40° , or 40.5° , respectively. So also 40.9° , 41.0° , and 41.1° must be registered. Furthermore, Minimum and Maximum Thermometers are read in the same manner. The indication of that one of the index which is next the surface of the spirit is alone noted. On opening the Thermometer Box, the Dry and Wet Bulb Thermometers are to be first, and then the other Thermometers, in the order in which they are respectively read, inasmuch as they are readily affected by heat from the person of the Observer.

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

When the Self-Registering Thermometers are read, snow, in winter at least, the extremes may occur at any hour; and it is necessary to register their occurrence to their proper meteorological day. In the Society's schedules, the indications registered on the 3d are those of the 2d, and those registered on the 4th are those of the 3d, and so on, as a series of phenomena commencing at 9 p.m. on the 24, and extending till 9 p.m. on the 3d.

No instrument ought to be used for Meteorological purposes till it has been carefully tested by comparison with a Standard Thermometer. When such Thermometers are not available, they 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 dial 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:—The divisions of the vernier of Barometers in reference to their scales; the position of the zero of the thermometer in reference to the scale; and the perfect freedom of the Barometer from air; the correct num-

water, in cases where the observations cannot be taken daily, the observation may be made on the 5th, 15th, and 25th of each month. When convenient, extra Sea Observations may be taken at low tide and greater depths, noting always the Temperature of the surface and the Hom of Observation. It is also very desirable that observations on the daily Maximum and Minimum Air and Thermometer readings should be constituted as a preliminary to the observations on the water.

T. S. Salts, already communicated at Newcastle and Liverpool.

The Temperature of the water at the bottom of Wells ought, if practicable, to be taken, both the depth of the Wells and the depth of the water being noted.

Monitor what Test-Papers are used, Schönbein's or Mollat's, etc.

Ozone. The Paper is affixed by a pin to a board in the Thermometer Box, and the indications registered at 9 a.m. and 9 p.m. It is desired that these indications be registered at 9 a.m. and 9 p.m. It is desired that these indications be registered at 9 a.m. and 9 p.m. It is desired that these indications be registered at 9 a.m. and 9 p.m.

observation, in the following manner:—thus 35° was an Ozone entry in the schedule will indicate that the Ozone paper is fitted as 3 on the scale, 0–5 is 4, or blowing fresh.

How much importance cannot be attached to the electric condition of the atmosphere in connection with terrestrial magnetism, barometrical, thermometrical, and meteorological phenomena generally. A proper Electrometer is, in truth, necessary to every complete meteorological observatory.

The Remarks column is completely too narrow. Some of the most valuable Observations that can be taken are those for which no rules can be given nor hours

Remarks.

Atmospheric Electricity.

assigned. The use of contractions, ought, therefore, to be taken every advantage of, and a list of such as are in general use is given at the foot of the column. Besides special 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 States of Clouds, the Clouds of the Morning and Evening, the Clouds of the Mountains and the Plains, the Clouds of the Barometer, Thunder-Storms and remarkable falls of Snow, Hail, and other remarkable and singular dissimulations, and fluctuations of the Elements, and the manner in which the Winds, especially on Rain, the Horn of Storms of Wind commencing, attaining their maximum, and ending, as well as such notes on Storms have been

limited at Clonsilla. When lofty hills are in the vicinity of a Station, the Heights of Clonsilla and of the Snow-line in winter should be recorded. By the use of abbreviations, the state of the weather at 9 a.m. and 9 p.m. should be registered either in two columns, otherwise unoccupied, or ruled off for purpose, from the column of Remarks.

Observations in connection with the Periodic Return of the Observations in Suseon, possess not only great scientific value, but are also of great importance to the Agricultural, Horticultural, 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. Observations ought to be confined to individual ground shrubs;

to particular species of birds, and, in the case of crops, to specific sorts reared from year to year on a selected piece of ground or farm. The Annual Table, published yearly in the Society's Journal, will indicate the species of plants and animals to which special attention is more particularly directed.

The Council recommend Observers, before purchasing new instruments, and in repairing old ones, to communicate with the Meteorological Secretary, in order that every instrument may be examined and improved before being used; and they consider it necessary that he should have full power to reject any instrument which, on being presented for comparison, does not show him satisfaction.

A. B.
(By Order)

Ennsuuznuh, December 1882.

[illegible][illegible]

ION WITH THE PERIOD	
In Leaf.	Divided of Leaves.
	GROPS.
	mentioning vari
	Barley,
	Here or Bigg
	Oats,
	Wheat,
	Beans,
	Pease,
	Potatoes,
	Turnips,
	Rye Grass,

[illegible]

Alder,
Asp,
Beech,
Birch,
Elm,
Larch,
Lime,
Oak,
Sycamore or Plane,

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ALEXANDER BUCHAN,
Secretary of the Meteorological Society.

[illegible][illegible]

Relative to the district generally.	Relative to the State generally.	MIGRATIONS.
Cuckoo, .		
Curlew, .		
House-Swallow,		
Lapwing,		
Plover, .		
Sand-Martin,		
Starling,		
Swan, .		
Rail or Goose,		

[illegible][illegible]

Barberry,
Bountree or Elder,
Broom,
Hazel,
Hawthorn,
Holly,
Laburnum,
Lilac,
Mazzeion,
Mountain Ash or Ro-
blee Flowering Curr-
rhodendron Poth-
Winn,
Have the goodne-
Turnips, Rhubarb, etc.,
Epizootic disease prev-

OBSERVATIONS IN CONNECTION WITH THE PERIODICAL RETURN OF THE SEASONS.

FOREST TREES.					
In Flower.		Alder,			
First buds.		Aspen,			
First appear.		Beech,			
		Birch,			
		Elm,			
		Larch,			
		Lime,			
		Oak,			Sycamore or Plane,
Dressed or in leaf.					
CROPS					
Growing or Planting.		Barley,			
		Hare or Pig,			
		Oats,			
		Wheat,			
		Beans,			
		Potatoes,			
		Turnips,			
		Rye Grass,			
First Out or hatched.					
In Ear or flower.					
First Appear. above Ground.					
Planting.					
Sowing or above Ground.					
First Out or hatched.					

Have the goodness also to state any information you may be able to collect relative to the crops of grain, hay, potatoes, turnips, fruits, etc., whether plentiful, or in perfection; whether any have suffered from blight, disease, etc. Whether any of the crops of the district generally have been unusually good or bad; and the agricultural condition of the district generally. Any other remarks you may think proper to add.

EDINBURGH.

Secretary of the Meteorological Society of Scotland,

Mr ALEXANDER BUCHAN.

0

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FOURTH DEC 1889

(By Order) A. B.

A. B.