

SCOTTISH METEOROLOGICAL SOCIETY.

Observations taken at *Westgate Villa, Colinton, County of Middlesex*, in Lat. _____, Long. _____, Distance from Sea *6* miles.Height of Cistern of the Barometer above Mean Sea-Level *380* feet, above Ground *4* feet.During the MONTH of *January* 189*8*.

The Hours of Observation are of Greenwich Time.

ELECTRICITY.	Days of Month.	BAROMETER.				SELF-REGISTERING THERMOMETERS. Read Daily, at 9 P.M.				HYGROMETER. Dry No. Wet No.				Rain.	WIND.				CLOUDS.				SUNSHINE.	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. No.	Wet bulb. No.	Dry bulb. No.	Wet bulb. No.	No. of hours in which it fell.	Amount in inches.	Direction. No.	Force. No.	Direction. No.	Force. No.	Velocity (0-6) and Direction. No.	Amount (0-10) and Species. No.	Velocity (0-6) and Direction. No.	Amount (0-10) and Species. No.	No. 3 inches.	No. 12 inches.	No. 22 inches.	Temperature of Wells at depth of feet, No.	Temperature at 1 fathom, and Density.			9 A.M.	9 P.M.	
		* No.																															
		inches.	°	inches.	°																												
	1	28.870	51	29.120	57	43.32.5	49	32	40.5	39.5	38.5	38.5	.01	N. 1.	1.	1.	1.	N. 2.	2.	2.	2.	1										1	
	2	29.300	51	29.580	56	41.3.9.5	43	35	40	40	40	39	.12	S. 6.	1.	6.	0.5	Oct	5	5	5											2	
	3	29.720	50	29.650	51	40.32.5	43	31	38	38	39.5	38.5	.03	S. 0.5				Oct	5	5	5											3	
	4	29.510	51	29.470	44	46.5.3.6	47	35.5	45	44.5	43	42.5	.02	N. 1.5	1.5	0.5		N. 5	5	5	5											4	
	5	29.450	50	29.370	53	43.5.2.9	44	28	31.5	31.5	40.3	40	.12	Calm	1.5	1.		N. 8	8	8	8											5	
	6	29.290	52	29.430	55	50.37.5	50	37	47	45	42	40.3	.14	N. 1.5	1.5	1.5		N. 10	10	10	10											6	
	7	29.450	52	29.560	54	42.33	43	32	35.5	34.5	38.5	36	.11	N. 1.5	1.5	2.		N. 10	10	10	10											7	
	8	29.350	49	29.500	56.5	45.3.6	46.5	34.4	43	41	42.5	41.5		N. 2.	2.	1.5		N. 10	10	10	10											8	
	9	29.480	52	29.620	58	43.3.35.3	43.5	34	41.3	39.5	39	37	.01	N. 0.5	1.5	1.5		Oct	4	4	4											9	
	10	29.580	51	29.620	53	46.3.6	47	35.5	42	38	45	44.5		N. 1.	1.	1.		N. 10	10	10	10											10	
	11	29.700	51	29.690	54	50.3.40	50.5	39	46.5	45	50.5	48.5		N. 1.	1.	1.5		N. 10	10	10	10											11	
	12	29.790	52	29.960	56	51.37.5	51	35	48	47	43.5	41		N. 0.5	1.5	1.		Oct	4	4	4											12	
	13	29.920	53	29.970	55	49.5.3.6	51	36	47.5	46.5	47	44		N. 1.	1.	1.5		N. 10	10	10	10											13	
	14	29.850	53	29.910	54	47.39.5	48	39	43.5	40.5	42	40		N. 2.	2.	1.		N. 10	10	10	10											14	
	15	29.920	52	29.980	57	44.8.37	47	37	42	39	41	38.5		N. 1.5	1.5	1.5		N. 10	10	10	10											15	
	16	29.920	52	29.830	56	45.3.6	49	38.5	41.5	39.5	42.5	41		N. 1.5	1.5	2.		N. 10	10	10	10											16	
	17	29.720	52	29.700	55	49.5.40	51	41	47.5	44.3	48.5	48.5		N. 2.	2.	2.		N. 10	10	10	10											17	
	18	29.500	53	29.500	56	50.5.45	51	43	48.5	44.5	47.5	46		N. 1.	1.	1		N. 10	10	10	10											18	
	19	29.450	54	29.500	56	56.3.6	52	43	54	51	45	43.5	.12	Calm				N. 10	10	10	10											19	
	20	29.700	53	29.800	56	47.3.8	49	38	38	37	41	38.5	.02	Calm				N. 10	10	10	10											20	
	21	29.750	54	29.810	55	48.3.8	47	37	46.5	45	40.5	38.5	.03	N. 1.	1.	1.		Oct	2	2	2											21	
	22	29.750	54	30.000	56	49.5.31.5	49	29.5	47	45	32.5	30.5	.15	N. 0.5	1.5	1.		N. 10	10	10	10											22	
	23	29.950	53	29.930	57	47.3.1	49	30	41	40	45	43	.01	N. 1.	1.	1.		N. 10	10	10	10											23	
	24	29.700	53	29.900	54	48.4.1	49	41	46	43	43	40		N. 1.5	1.5	1.5		N. 10	10	10	10											24	
	25	29.850	53						48	46				N. 1.				N. 10	10	10	10												25
	26	29.650	50	29.670	53	50.4.5	50	45	45	43.5	47	43		N. 1.5	2.	2.		N. 10	10	10	10											26	
	27	29.800	?	29.870	53	49.5.40	51	41	47	45	48.5	48.5		Calm	N. 1.5			Oct	1	1	1											27	
	28	29.900	54	29.960	55	49.5.46	50	42	43	40	47	44		5	N. 1.5			Oct	4	4	4											28	
	29	29.650	53.5	29.550	53	52.4.5	52	44	46	44	52	51.5		N. 2.	2.	1.5		N. 10	10	10	10											29	
	30	29.500	54	29.400	59	55.4.6	55	45	51	47	51.3	49.5	.02	N. 1.5	1.5	2.		N. 10	10	10	10											30	
	31	29.760	53.5	29.600	57	51.3.8	51	37	41.3	38	47	45.3	.11	N. 1.5	1.5	2.		N. 10	10	10	10											31	
	Sums.					136 4.3	121 4.2	145 15.3	136 13.9	102																							
	Means.					82 6.3	85 3.4	121 6.23	110 6.560																								
	+ 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		

NOTATION USED IN GENERAL REMARKS.

a.	denotes aurora.	m.	denotes meteor.
ci.	cirrus.	ms.	meteors.
ci-cu.	cirrus-cumulus.	n.	nimbus.
ci-s.	cirrus-stratus.	r.	rain.
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.	solar halo.
h. d.	heavy dew.	sq.	squall.
hl.	hail.	sq.	squalls.
l.	lightning.	t.	thunder.
li. cl.	light clouds.	t. s.	thunder-storm.
li. sh.	light showers.	w.	wind.
lu. co.	lunar corona.	g.	gale of wind.
lu. 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 \ddagger for Temp. (Col. 2), = _____

"Corrected Mean" of Barometer at 9 P.M., minus the Correction \ddagger for Temp. (Col. 4), = _____

Mean at Station, corrected, and at 32°, = _____

Correction for height, feet above Mean Sea-level, = _____

Mean, reduced to 32°, and Sea-level, = _____

Highest Reading, corrected for Index error, on the _____ th, = _____

Lowest Do. Do. on the _____ th, = _____

Difference, or Monthly Range, = _____

S.-R. THERMOMETER, (in shade, etc.), Highest in Month, (corrected for Index Errors), on the _____ th, = *58.0*

Lowest in Month, corrected for Index errors, on the _____ th, = *29.0*

Difference, or Monthly Range, = *29.0*

"Corrected Mean" of all the Highest, (Col. 5), = *47.6*

"Corrected Mean" of all the Lowest, (Col. 6), = *37.2*

Difference, or Mean Daily Range, = *9.2*

** Calculated Mean Temperature of Month, = *42.8*

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), = *43.7*

Mean (corrected) A.M. and P.M. Reading of Wet Bulb, (Cols. 10 and 12), = *41.9*

† Computed Temperature of Dew-Point, = *38.8*

†† Do. Elastic Force of Vapour, = *246*

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

†† Relative Humidity (Saturation = 100), = *86*

RAIN fell on *15* Days; Amount in Inches, = *1.02*

WIND.	SUMMARY.									
	Direction.	N	NE	E	SE	S	SW	W	NW	Mean Force.
A.M.					1	1	2	1	4	.97
P.M.			1	3	2		2	19	2	1.19
Mean.		0	1	2	2	1	3	18	1	1.08

Observations made and
Return verified by

James McManus
Westgate Villa, Colinton

(Signed)

SCOTTISH METEOROLOGICAL SOCIETY.

Observations taken at Westgarth Villa, Bilton, County of Midlothian, in Lat. 55° 55', Long. 2° 15' W, Distance from Sea 6 miles.

Height of Cistern of the Barometer above Mean Sea-Level 380 feet, above Ground 4 feet.

During the MONTH of February 1898.

The Hours of Observation are of Greenwich Time.

ELECTRICITY.	Days of Month.	BAROMETER. <i>Anemoid.</i>				SELF-REGISTERING THERMOMETERS. Read Daily, at 9 P.M.				HYGROMETER.				Rain.		WIND.				CLOUDS.				SUNSHINE.	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.		No. of hours in which it fell.	Amount in inches.	9 h. A.M.		9 h. P.M.		No. of hours.	Amount (0-10), and Direction.	No. of hours.	Amount (0-10), and Direction.		9 h. A.M.											
		Barometer.	Attached Thermometer.	Barometer.	Attached Thermometer.	Max. No.	Min. No.	Max. No.	Min. No.	Dry bulb.	Wet bulb.	Dry bulb.	Wet bulb.			Direction.	Force.	Direction.	Force.						No. 5 inches.	No. 12 inches.	No. 22 inches.									
	1	29.510	53	29.160	57	55	40.5	57	40.5	48	45.5	42.5	40	.02		N.W. 1.5	1.5	N.W. 2.5	2.5	2	8	3	2								1					
	2	28.750	53	29.400	55	44.5	34	49	32	40.5	37.5	36.5	32.5	.28		N. 2	1.5	N. 1	1	2	1	1	2								2					
	3	29.300	50	29.120	53	44.5	30.5	43	29	37.5	36	34.5	33			N. 1	1	N. 1	1				3								3					
	4	29.050	48	29.300	50	37	28	44	28	31.5	28.5	30.5	29.3			N.W. 0.5	0.5	N. 1	1				3								4					
	5	29.300	46	29.400	48	37.5	27.5	41.5	25	32.4	31.7	35.5	32			N. 1	1	N. 1	1				3								5					
	6	29.100	48	29.080	54	42.5	29.5	42.5	29	36	34.5	33	32			N.W. 1	1	N. 1.5	1.5				4								6					
	7	29.200	49.5	29.450	53	39.5	28	43	28	32	31	35	33.5	.06		N. 1	1	N. 1.5	1.5				3								7					
	8	29.420	50	29.620	57	44.5	33	43	31.3	37.5	36	37.5	35.5			N.W. 1.5	1.5	N. 1.5	1.5				3								8					
	9	29.540	48	29.520	52	46.3	35	50	33	41.5	40.5	44.5	42.5			N. 1.5	1.5	N. 2	2				1								9					
	10	29.540	51	29.560	54	52.5	42	55	41.5	47	45	46	43			N. 0.5	0.5	N. 2	2				3								10					
	11	29.575	51	29.730	52	47.8	38	51.5	38	42.5	41.3	44	40.5	.10		N.W. 1	1	N. 1.5	1.5				3								11					
	12	29.500	51	29.420	56	47	37	50	37.5	46	43	38.5	38			N. 3	3	N. 1.5	1.5				2								12					
	13	29.530	51	29.450	55	42	33	50	31	37.5	35.5	41	38.3			N. 2	2	N. 2.5	2.5				3								13					
	14	29.500	51.5	29.620	53	45.5	37	50.5	35.5	41	38	46.5	43.5	.08		N. 1.5	1.5	N. 2.5	2.5				2								14					
	15	29.250	51.5	29.270	54	42.5	39	55	39.5	41.5	38.5	43	39.5	.04		N. 3	3	N. 3	3				1									15				
	16	29.350	51	29.600	56	44	33	48	31	38.5	36	36	32.5	.20		N.W. 3	3	N. 2	2				2									16				
	17	29.600	50	29.500	52	40.3	32	45	30	36.5	33.5	35	33.5			N. 0.5	0.5	N. 0.5	0.5				1									17				
	18	29.540	48	29.620	49.5	38	27.5	55	25	31.5	29.5	30	28			Calm	1	N. 1	1				3									18				
	19			28.850	53.5	42	27	43	25	33	31	41	39.5				1.5	N. 1.5	1.5				1									19				
	20	28.800	48	28.600	53	41	26	61	26	29	27.5	29.5	28	.13		N.W. 0.5	0.5	N.W. 2	2				5									20				
	21	28.790	46	28.910	51	37	20.5	39	20	27.5	26.5	34	32.5			N. 1	1	N. 0.5	0.5				1									21				
	22	29.090	46	29.370	51	38.5	24	51	21	32.5	30.5	31.5	31.5			N. 1	1	N. 0.5	0.5				2									22				
	23	29.540	46	29.670	50	40.5	25	70	21.5	33	30	30.5	28.5			N.W. 0.5	0.5	Calm	1				3									23				
	24	29.670	46	29.670	49	43.5	28	56.5	20	33.5	30	37	34.5			Calm	1	N. 1.5	1.5				4									24				
	25	29.530	46	29.050	51	42.5	34	47	35	37	34.5	39	38			N.W. 1.5	1.5	N. 1.5	1.5													25				
	26	29.240	48							38	36	36	34																				26			
	27	29.300	47	29.350	53	45	32	73	31	38.5	37	37	35.5	.19		N. 9	9	N. 1.5	1.5				3									27				
	28	29.390	48	29.250	53	43	31.5	65	31	37	35	38.5	36.8			N.W. 1	1	N. 1.5	1.5				3									28				
	29																																29			
	30																																30			
	31																																31			
Sums.						127	133	92	103	137	123	136	138	1.34			5		8																	
Means.						950	475	255	023	1479	1388	25	59				300		390																	
+ Total Corrections for Instrumental Errors.																																				
+ Corrections for Diurnal Range.																																				
"Corrected Means."						434	317	509	301	371	349	372	352				107		139																	
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					

NOTATION USED IN GENERAL REMARKS.

a.	denotes aurora.	m.	denotes meteor.
ci.	cirrus.	ms.	micro-meteor.
ci-cu.	cirro-cumulus.	n.	nimbus.
ci-s.	cirro-stratus.	r.	rain.
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.	so. ha.	solar halo.
h.	haze.	sq.	squall.
h. d.	heavy dew.	sq.s.	squalls.
hl.	hail.	t.	thunder.
l.	lightning.	t. s.	thunder-storm.
li. cl.	light clouds.	w.	wind.
li. sh.	light showers.	w.	wind.
lu. co.	lunar corona.	g.	gale of wind.
lu. ha.	lunar halo.		

TABLE FOR ESTIMATING FORCE OF WIND.

Estimated Force, 0-5.	Common Designation.	Estimated Force, 6-10.	Common Designation.	Estimated Force, 11-15.	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 \ddagger =
for Temp. (Col. 2), =
"Corrected Mean" of Barometer at 9 P.M., minus the Correction \ddagger =
for Temp. (Col. 4), =
Mean at Station, corrected, and at 32°, =
Correction for height, feet above Mean Sea-level, =
Mean, reduced to 32°, and Sea-level, =
Highest Reading, corrected for Index error, on the th, =
Lowest Do. Do., on the th, =
Difference, or Monthly Range, =

S.-R. THERMOMETER, (in shade, etc.), Highest in Month, (corrected for Index Errors), on the th, = 55.0
Lowest in Month, corrected for Index errors, on the th, = 20.5
Difference, or Monthly Range, = 34.5
"Corrected Mean" of all the Highest, (Col. 5), = 43.4
"Corrected Mean" of all the Lowest, (Col. 6), = 31.7
Difference, or Mean Daily Range, = 11.7
** Calculated Mean Temperature of Month, = 37.6
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), = 37.2
Mean (corrected) A.M. and P.M. Reading of Wet Bulb, (Cols. 10 and 12), = 35.0
Computed Temperature of Dew-Point, = 31.9
Do. Elastic Force of Vapour, = 180
Do. Weight of Vapour in a Cubic Foot of Air, =
Relative Humidity (Saturation = 100), = 81
RAIN fell on 10 Days; Amount in Inches, = 1.34

WIND.	SUMMARY.									
	Direction.	N	NE	E	SE	S	SW	W	NW	Mean Force.
A.M.		1				1	3	13	4	107
P.M.		2	1			1	18	2		139
Mean.		2.00	1	1	2	1.5	3	4		123

Observations made and
Return verified by

James Munro
Westgarth Villa, Bilton.

(Signed)

OBSERVATIONS,

The Council of the Society recommended that the Self-Registering Thermometers, and the Dry and Wet Bulb Hygrometers, be kept in Stevenson's Louver-boarded Box for Thermometers, painted white inside and outside, and screwed to four stout posts, also painted white, firmly fixed in the ground. The posts must be of such a length that, when the Thermometers are hung in position the Bulbs of the Minimum Thermometer and of the Dry and Wet Bulb Thermometers, will be exactly at the same height of four feet above the ground. The Maximum Thermometer being hung immediately above the Minimum thermometer. The Thermometer Box is to be placed over a plot of grass, and in a free open space to which the winds have free access, thus insuring as much uniformity as possible in the observations. The Box must face the door, which should open to the north, and be so placed that the sun should never shine on the front of the Box. The Council regard the question of UNIFORMITY OF HEIGHT above the ground, AND METHOD IN PROTECTING THE THERMOMETERS, as of the greatest importance, and have accordingly recommended that, in every system of Meteorological Observation, since without it Observations made at different Stations are incomparable, it is absolutely impossible to compare the Climates of places with each other as regards their most important features.

Professor Phillips, and Negretti and Zambri's Maximum Thermometers, and their respective Minimum Thermometers, are recommended. It is recommended that these Thermometers be graduated on the glass stem. The Minimum Thermometer is liable to two arrangements—viz., the bulb of spirit breaking, and part of the spirit discharging by high temperature and lodging at the top of the tube. This derangement of occasional occurrence with protected Thermometers, but of frequent occurrence with exposed Thermometers. Hence a systematic examination of Minimum Thermometers ought to be a regular part of the work carried on by each Observer. Fortunately, Spirit Thermometers may be easily put right by

thermometer be taken in the hand by the end farthest from the bulb, raised above the head, and then forcibly swung down towards the feet; the object being, on the principle of centrifugal force, to draw down the detached portion of spirit till it unites with the column. A few throws, or swinging strokes, will generally be

not sufficient for the purpose; after which the thermometer should be placed in a slanting position, to allow the rest of the spirit still adhering to the sides of the tube to drain down to the column. But every other method must be adopted, if the portion of spirit in the top of the tube be small. Great should be applied, however, to prevent the top end of the tube from being cooled by the contact of spirits, so that the vapour in the tube may condense on the interior surface of the unbroken column of spirit. Care must be taken that the heat is not applied too quickly; for if this be done, the tube will break and the instrument be destroyed. The best way to apply the requisite amount of heat is by bringing the end of the tube slowly downwards towards a minute flame from a gas-burner; or, if gas be not at hand, a piece of heated metal will serve instead.

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

thermometers. During night, have a 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 uncracked boxes, whose sides protect the bulbs from the wind, and the thermometer 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 Minimum Thermometer by distillation. Black-bulbs enclosed in glass jackets may also be used, being indeed preferable to the

It must, however, be added, that the violent effect 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 used at the Society's Stations consists of two Thermometers usually, but not necessarily, mounted on a single frame. As apparently slight deviations from the approved form of this apparatus seriously vitiate the Hygrometrical Observations, Observers are specially requested to attend to the following conditions:—The bulbs must hang down at least an inch free from the scales and frame to which they are attached.

attached; the frame must be such that it may be suspended; the varnish must be covered, and altogether placed to the side, and a little below the level of the wet bulb, but in no case under the bulbs; and the thermometer must be of medium fineness and fastened at the neck of the bulb by the cotton, which also supplies it with water. It must be taken care to by the Observer that the muslin is always clean and moist, and that the water pipe. In frosty weather, observation is a matter of much delicacy, and must be made with great care. The bulb must be moistened by immersion from 15 to 80 minutes before the hour of observation. From the film of ice thus formed evaporation will proceed as from the moist cloth in ordinary circumstances.

In reading the Thermometer great 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 the Thermometer will be read -39.4° , 40.0° , or 40.1° ; or again, 40.0° , 40.3° , 40.6° , according as it indicates a little under, an exact coincidence with, or a little over 40° , or 40.3° , respectively. So also

The Hygrometer is read at 9 A.M. and 9 P.M. The Self-Registering Thermometers are read at 9 P.M. only, as in-coming or observing disking the greatest and least degrees of temperature during the 24 hours preceding. It is not matter of temperature.

difference when the Self-Registering Thermometers are read, since in a winter at least, the extremes may occur at any hour; and it is necessary to refer their occurrence to their proper meteorological day. In the Society's schedules, the indications registered on the way are those of a series of phenomena commencing at 9 p.m. on the 3d, 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 as are not graduated on the stem, but merely on an attached scale, undergo repairs, they are very liable to be moved from their position on the Scale, and ought never afterwards to be used without being re-tested. The Self-Registering, especially the Minimum Thermometers, ought frequently to be compared with the dry bulb of the Hygrometer. The freezing-point of each thermometer, marked by a scratch on the tube, ought to be tested once a year, in snow or melting ice.

In selecting instruments, the following points require attention.—The divisions of the vernier of Barometers in reference to the sea-level, and the perfect freedom of the Barometer from air; the

correct numbering of the scale every instrument, the rejection of thermometers the frameworks of which are not likely to stand exposure to the weather, as shown in the past by repeated and annoying breakages of thermometers of similar construction; and as regards Maximum Thermometers, either Negretti & 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 Observers have a right to have their instruments compared by the Secretary, and to advise him in requesting the purchase of instruments. Very great care will be taken to have the Observations of the Wind, the amount of Rain, and the amount of Snow, recorded.

A Wind-Vane ought to be elevated at least 12 feet above sur-

As regards mean direction should be taken. In all cases, but especially when the Y-axis is stationary, and when the wind is feeble, references may be made to the direction of smoke, etc., 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 thinly-planted Stations over a limited district round Edinburgh called *STORM STATIONS*, in the course of being established by the Society for the systematic investigation of the relation of the force of the wind to *BAROMETRIC GRADIENTS*, and other points connected with storms.

2. As regards the aneroid, the Hemispherical 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 observation may be ascertained. For indicating the Force of the Wind at any particular hour of observation, the Pressure Anemometers recently brought under the notice of the Society by Mr. T. Stevenson, the Honorary Secretary, and Mr. R. Ballgall, the Society's Observer at Eddisbury, are recommended as likely to secure uniformity in making observations on the Force of the Wind.

Many causes conspire to produce anomalies in Rain Returns arising partly from the difficulty of obtaining a perfectly 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. 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., and W. The form of the gauge must be perfectly level, and checked with a spirit

remain level in all weathers, and 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 used, it being found that a stem projecting above the rim of the gauge seriously interferes with the proper measurement of the Rain or 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 be conveniently registered in the rain columns, by the following method:—

Snow-falls.—When a heavy snow-fall occurs, the gauges should be covered with a sheet of paper, 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 entered in every column, the Observer cannot be too careful to register observations only; and nothing that partakes of the nature of deduction or inference.

[illegible]

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, 6. S. W. — will indicate that the upper strata of Clouds travel with 2. 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 —

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 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.

Sumshine.

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

A knowledge of the relations of the ocean to the atmosphere is important in its relations to that of our island, and 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 at 5, 10, 15, or 25th of each day. When convenient, extra Sea Observations might be taken for other and greater depths, noting 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 temperature

Mention what Test-Papers are used, Standard Methods, Moffat's 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 the same time, and that the direction of the wind at the time of observation, in the following manner:—thus 32° W., an Ozon entry in the schedule will indicate that the Ozon paper is fixed as 3 on the scale, that the wind is from the N.W., and that its force on the scale 0—3 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 electric phenomena.

Atmospheric Electricity.

Electrometer is, in truth, necessary to every complete meteorological observatory.

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

The use of contractions ought, therefore, to be taken 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 Prevailing Diseases, differences in character, colour, velocity, and direction, between the Lower and Upper Strata of clouds, the Colour of the Sky, &c. Remarks ought to be made on the occurrence of Meteors, Auroræ Boreales, remarkable depressions, elevations, and fluctuations of the Barometer, Thunder-storms, and remarkable falls of snow, Hail

or Rain, the Hour of Storms of Wind commencing, awaiting their maximum, and ending, as well as such Notes on Storms as have been transmitted above. When lofty hills are in the vicinity of a Station, the Height of Clouds, and 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 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 also of considerable importance in connection with Agriculture, Horticulture, and Natural History. The Council would direct the special attention of Observers to the registration of such phenomena, so that the published Summaries may fairly represent the whole of Scotland. Observations ought to be confined to individual trees and shrubs; to particular species of birds, and, in the case of crops, to specified portions thereof 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 more particularly directed.

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.

A. B.
(By Order)

Out _____

[illegible][illegible]

TOPICAL
OPS.
Bigg
ing variety.
s,
ss,

CH mention	Barley,	Bere on	Oats,	Wheat,	Beans,	Pease,	Potatoes,	Turnips,	Rye Grass
---------------	---------	---------	-------	--------	--------	--------	-----------	----------	-----------

Leaf.	
Divested of Leaves.	

In flower.	
Leaf buds	
First Appear.	
Id.	

FOREST TREES.	Alder,	Asp,	Beech,	Birch,	Elm,	Larch,	Lime,	Oak,	Sycamore or Plane,
---------------	--------	------	--------	--------	------	--------	-------	------	--------------------

OBSERVATIONS IN CONNECTION WITH THE PERIODICAL RETURN OF THE SEASONS.

FOREST TREES.		SHRUBS, ETC.		FRUITS.		MIGMATORY BIRDS.	
Alder,	Flower.	Barberry,	First in Blossom.	Apple,	First in Blossom.	Cuckoo,	First Arrival.
Sycamore or Plane,		Bouthee or Elder,		Black Currant,		Chew,	
Ash,		Broom,		Cherry,		House-Swallow,	
Beech,		Hazel,		Cean,		Lapwing,	
Birch,		Flawhorn,		Cgooseberry,		Plover,	
Larch,		Holly,		Pear,		Sand-Martin,	
Lime,		Laburnum,		Pear,		Starling,	
Oak,		Lilac,		Plum,		Swan,	
		Mountain Ash or Rowan,		Strawberry,		Rail or Corn Crane,	
		Red Flowering Currant,					
		Rhododendron Ponticum,					
		Whin,					

Have the goodness also to state any information you may be able to collect relative to the crops of Grain, Hay, Potatoes, Fruits, etc., whether plentiful, or in part, and the Agricultural condition of the district generally. Epizootic disease prevails among cattle; and the Agricultural condition of the district generally.

To the SECRETARY

Scottish Meteorological Society.

122 George Street.

EDINBURGH.



The Hours of Observation are of Greenwich Time.

[illegible]

BAROMETER, "corrected Mean" at 9 A.M., <i>minus</i> the Correction $\uparrow\uparrow$	}	=	_____
for Temp. (Col. 2), =			_____
"Corrected Mean" of Barometer at 9 P.M., <i>minus</i> the Correction $\uparrow\uparrow$	}	=	_____
for Temp. (Col. 4), =			_____
Mean at Station, corrected, and at 32°,		=	_____
Correction for height, _____ feet above Mean Sea-level,		=	_____
Mean, reduced to 32°, and Sea-level,		=	_____
Highest Reading, corrected for Index error, on the _____ th,		=	_____
Lowest Do. _____ Do., _____ on the _____ th,		=	_____
Difference, or Monthly Range,		=	_____

S.-R. THERMOMETER, (in shade, etc.), **Highest in Month,** (corrected for Index Errors), on the 1st th..... = 54.5

Lowest in Month, corrected for Index errors, on the 8th, = 24.0

Difference, or **Monthly Range,** = 30.5

"Corrected **Mean**" of all the **Highest,** (Col. 5), = 44.8

"Corrected **Mean**" of all the **Lowest,** (Col. 6), = 32.0

Difference, or **Mean Daily Range,** = 12.8

** Calculated **Mean Temperature** of Month, = 38.4

S.-R. THERMOMETER, **Black Bulb in Sun, Highest,** (corrected for Index Errors), on the 1st th, 3rd = 82.0

"Corrected **Mean,**" (Col. 7), of **Black Bulb, Max. in Sun,** = 64.2

Lowest at Night, (Black Bulb) (corrected for Index errors), on the 8th, = 22.0

"Corrected **Mean,**" (Col. 8), of **Black Bulb, Min. on grass,** = 31.5

Difference of above means or range ("exposed"), =

HYGROMETER, Mean (corrected) A.M. and P.M. Reading of Dry Bulb, (Cols. 9 and 11),	=	38.7
Mean (corrected) A.M. and P.M. Reading of Wet Bulb, (Cols. 10 and 12),	=	36.6
Computed Temperature of Dew-Point,	=	33.8
Do. Elastic Force of Vapour,	=	195
Do. Weight of Vapour in a Cubic Foot of Air,	=	
Relative Humidity (Saturation = 100),	=	84
RAIN fell on 10 Days; Amount in Inches,	=	1.46

WIND.		SUMMARY.									
Direction.	N	NE	E	SE	S	SW	W	NW	Calm or Variable.	Mean Force.	Mean Velocity in miles per day
A.M.	2	2	2	2	1	3	11	4	4	95	
P.M.		2		1		2	15	1	3	170	
Mean.	1	5	1	2	1	2	13	3	3	100	

Observations made and
Return verified by

(Signed) _____

Colinton, County of Midlothian

Height of Cistern of the Barometer above Mean Sea-Level 280 feet, above Ground 4 feet.

The Hours of Observation are of Greenwich Time.

NOTATION USED IN GENERAL REMARKS.					
a.	<i>denotes aurora.</i>	m.	<i>denotes meteor.</i>	n.	<i>meteors.</i>
ci.	<i>cirrus.</i>	n.	<i>nimbus.</i>	r.	<i>rain.</i>
ci.-cu.	<i>cirro-cumulus.</i>	h.	<i>hail.</i>	h. r.	<i>heavy rain.</i>
ci.-s.	<i>cirrus-stratus.</i>	c. h. r.	<i>continued heavy rain.</i>	s.	<i>stratus.</i>
cu.	<i>cumulus.</i>	sc.	<i>scud.</i>	s.	<i>sleet.</i>
cu.-s.	<i>cumulo-stratus.</i>	so.	<i>snow.</i>	so. ha.	<i>solar halo.</i>
d.	<i>dew.</i>	sq.	<i>squall.</i>	s.	<i>squalls.</i>
f.	<i>fog.</i>	l.	<i>lightning.</i>	t. s.	<i>thunder.</i>
fr.	<i>frost.</i>	w.	<i>wind.</i>	g.	<i>gale of wind.</i>
h. fr.	<i>hoar-frost.</i>				
h.	<i>haze.</i>				
h. d.	<i>heavy dew.</i>				
h.	<i>hail.</i>				
li.	<i>light.</i>				
li. cl.	<i>light clouds.</i>				
li. sh.	<i>light showers.</i>				
li. co.	<i>lunar corona.</i>				
lu. ha.	<i>lunar halo.</i>				

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 g.

S.-R. THERMOMETER , (in shade, etc.), Highest in Month , (corrected for Index Errors), on the 21 th	=	61.5
Lowest in Month , corrected for Index errors, on the 5 th	=	30.5
Difference, or Monthly Range ,	=	31.0
"Corrected Mean " of all the Highest , (Col. 5),	=	53.1
"Corrected Mean " of all the Lowest , (Col. 6).....	=	38.4
Difference, or Mean Daily Range ,	=	14.7
** Calculated Mean Temperature of Month,	=	45.8
<hr/>		
S.-R. THERMOMETER , Black Bulb in Sun , Highest , (corrected for Index Errors), on the	=	
"Corrected Mean ," (Col. 7), of Black Bulb, Max. in Sun ,	=	
Lowest at Night , Black Bulb (corrected for Index errors), on the	=	
"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),	=	45.8
Mean (corrected) A.M. and P.M. Reading of Wet Bulb , (Cols. 10 and 12),	=	43.1
‡ Computed Temperature of Dew Point ,	=	40.0
‡ Do. Elastic Force of Vapour ,	=	248
‡ Do. Weight of Vapour in a Cubic Foot of Air ,	=	
‡ Relative Humidity (Saturation = 100),	=	81
RAIN fell on B Days ; Amount in Inches ,	=	1.95

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	2	1	6	4	5	4	3	.88	
P.M.			3	2		2	7	1	5-		1.07
Mean.	0	1	2	2	3	3	13	2	4	.98	

* 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 observer may be here given.
† Emending corrections for both capillary and Index Errors.
‡ The Diurnal Range for Scotland is as yet unknown.
§ Practically, though not absolutely a minus correction.
|| These "Hygrometric Deductions" are calculated from Glashier's Hygrometrical Tables, Second Edition only.
¶ While the Diurnal Range is indicated, the Aristotelical Mean of Cold, & Warm 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.

Observations made and
Return verified by

(Signed)

