

SCOTTISH METEOROLOGICAL SOCIETY.

Observations taken at Robert Gordon's College, Aberdeen, County of Aberdeen, in Lat. 57° 6' N, Long. 2° 9' W, Distance from Sea 1 miles.

Height of Cistern of the Barometer above Mean Sea-level 66 feet, above Ground 2 $\frac{1}{2}$ feet.

During the MONTH of February 1888

The Hours of Observation are of Greenwich Time.

[illegible]

BAROMETER, "corrected Mean" at 9 A.M., minus the Correction $\uparrow\uparrow$	=	29.960
for Temp. (Col. 2), = 29.994.... - .034....		
Corrected Mean " of Barometer at 9 P.M., minus the Correction $\uparrow\uparrow$	=	29.943
for Temp. (Col. 4), = 29.978.... - .035....		
Mean at Station, corrected, and at 32",	=	29.952
Correction for height, 66 feet above Mean Sea-level,.....	=	.074
Mean, reduced to 32", and Sea-level,	=	30.026
Highest Reading, corrected for Index error, on the 28 th ,.....	=	30.554
Lowest Do. Do. on the 11 th , 4.12 ^d	=	29.332
Difference, or Monthly Range,	=	1.222

S.-R. THERMOMETER, (in shade, etc.), Highest in Month, (corrected for Index Errors), on the 6 th ,	=	<u>52.3</u>
Lowest in Month, corrected for Index errors, on the 17 th ,	=	<u>11.2</u>
Difference, or Monthly Range,	=	<u>41.1</u>
"Corrected Mean " of all the Highest, (Col. 5),	=	<u>39.5</u>
"Corrected Mean " of all the Lowest, (Col. 6),	=	<u>30.1</u>
Difference, or Mean Daily Range,	=	<u>9.4</u>
** Calculated Mean Temperature of Month,	=	<u>34.8</u>

S.-R. THERMOMETER, Black Bulb in Sun, Highest, (corrected for Index Errors), on the 1 st ,	=	
"Corrected Mean " (Col. 7), of Black Bulb, Max. in Sun,	=	
Lowest at Night, Black Bulb, (corrected for Index errors), on the 1 st , ...	=	
"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), =

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

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

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

AIN fell on 23 Days; Amount in Inches,

RAIN fell on 23 Days; Amount in Inches, = 2.17

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	1	5	2	0	0	5	12	0	0.79	
P.M.	6	2	2	3	1	8	5	7	0	0.93	
Mean.	5	1	4	2	1	2	5	9	0	0.86	= 0.79

Observations made and
Return verified by

James Dale, Teacher in
Robert Gordon's College

(Signed)

Greatest daily range = 23.2 on the 17th

J. G.

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SCOTTISH METEOROLOGICAL SOCIETY.

Observations taken at Gordon's College, County of Aberdeen, in Lat. 59° 7' N, Long. 2° 6' W, Distance from Sea 1 mile.

Height of Cistern of the Barometer above Mean Sea-level 66 feet, above Ground 2 1/2 feet.

During the MONTH of March 1888

The Hours of Observation are of Greenwich Time.

ELECTRICITY.	Days of Month.	BAROMETER.				SELF-REGISTERING THERMOMETERS. Read Daily, at 9 P.M.				HYGROMETER.				RAIN.		WIND.				CLOUDS.				SUNSHINE. Hours.	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.		No. of hours in which it fell.	Amount in inches.	9 h. A.M.		9 h. P.M.		Readings of the H. Cup Anemometer. No. _____ 9 h. A.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		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.																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																									

BAROMETER, "corrected Mean" at 9 A.M., minus the Correction $\dagger\dagger$ for Temp. (Col. 2), = 29.580
 Corrected Mean" of Barometer at 9 P.M., minus the Correction $\dagger\dagger$ for Temp. (Col. 4), = 29.586
 Mean at Station, corrected, and at 32°, = 29.583
 Correction for height, 66 feet above Mean Sea-level, = 0.074
 Mean, reduced to 32°, and Sea-level, = 29.657
 Highest Reading, corrected for Index error, on the 19 th, = 30.456
 Lowest Do. Do., on the 27 th, = 28.824
 Difference, or Monthly Range, = 1.632

S.-R. THERMOMETER, (in shade, etc.), Highest in Month, (corrected for Index Errors), on the 7 th, = 53.6
 Lowest in Month, corrected for Index errors, on the 28 th, = 17.6
 Difference, or Monthly Range, = 36.0
 "Corrected Mean" of all the Highest, (Col. 5), = 41.7
 "Corrected Mean" of all the Lowest, (Col. 6), = 30.8
 Difference, or Mean Daily Range, = 10.9
 ** Calculated Mean Temperature of Month, = 36.2
 S.-R. THERMOMETER, Black Bulb in Sun, Highest, (corrected for Index Errors), on the th, =
 "Corrected Mean," (Col. 7), of Black Bulb, Max. in Sun, =
 Lowest at Night, Black Bulb, (corrected for Index errors), on the th, =
 "Corrected Mean," (Col. 8), of Black Bulb, Min. on grass, =
 Difference of above Means or Range ("exposed"), =

HYGROMETER, Mean (corrected) A.M. and P.M. Reading of Dry Bulb, (Cols. 9 and 11), =
 Mean (corrected) A.M. and P.M. Reading of Wet Bulb, (Cols. 10 and 12), =
 # Computed Temperature of Dew-Point, =
 # Do. Elastic Force of Vapour, =
 # Do. Weight of Vapour in a Cubic Foot of Air, =
 # Relative Humidity, (Saturation = 100), =
 RAIN fell on 21 Days; Amount in Inches, = 3.50

WIND.		SUMMARY.							
Direction.		N	NE	E	SE	S	SW	W	NW
A.M.		6	5	8	2	0	2	3	5
P.M.		7	5	6	3	2	3	1	4
Mean.		7	5	7	2	1	3	2	4

* 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.
 \dagger Embracing corrections for both capillarity and Index Errors.
 $\dagger\dagger$ The Diurnal Range for Scotland is as yet unknown.
 $\dagger\dagger\dagger$ 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.

Observations made and Return verified by James Dale, Teacher in Robert Gordon's College, Aberdeen

(Signed)

Greatest daily range = 28.2 on the 21 th

J. P. J. P.

SCOTTISH METEOROLOGICAL SOCIETY.

Observations taken at *Robert Gordon's College*, County of *Aberdeen*, in Lat. *57° 9'*, Long. *2° 6'*, Distance from Sea *1* miles.

Height of Cistern of the Barometer above Mean Sea-level *66* feet, above Ground *2 1/2* feet.

During the MONTH of *April* 188*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.				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. <i>Mention the hour at which Storms, including Thunder and Lightning, began and ended.</i>		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.		Readings of the H. Cup Anemometer No. ———	9 A.M.		P.M.		SUNSHINE. Hours.	9 h. A.M.						Temperature of air at No. feet No.	Temperature of surface and Dew- point.	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.	Min. on Grass.	Dry bulb.	Wet bulb.	Dry bulb.	Wet bulb.			Direction.	Force	Direction.	Force		Velocity (0—10), and Direction.	Amount (0—10), and Species.	Velocity (0—10), and Direction.	Amount (0—10), and Species.		No. 1 inches.									No. 2 inches.	No. 3 inches.																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																				
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NOTATION USED IN GENERAL REMARKS.

a.	denotes aurora.	m.	denotes meteor.
ci.	cirrus.	ms.	meteors.
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.	devis.	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.
l. cl.	light clouds.	t. s.	thunder storm.
l. 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, 0-6.	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†† = *29.794*
for Temp. (Col. 2), = *29.840* - *.046* = *29.794*
Corrected Mean” of Barometer at 9 P.M., minus the Correction†† = *29.790*
for Temp. (Col. 4), = *29.836* - *.046* = *29.790*
Mean at Station, corrected, and at 32°, = *29.792*
Correction for height, *66* feet above Mean Sea-level, = *.074*
Mean, reduced to 32°, and Sea-level, = *29.866*
Highest Reading, corrected for Index error, on the *25*th, = *30.286*
Lowest Do. Do., on the *13*th, = *29.276*
Difference, or Monthly Range, = *1.010*

S.-R. THERMOMETER, (in shade, etc.), Highest in Month, (corrected for Index Errors), on the *16*th, = *60.3*
Lowest in Month, corrected for Index errors, on the *8*th, = *29.7*
Difference, or Monthly Range, = *30.6*
“Corrected Mean” of all the Highest, (Col. 5), = *49.0*
“Corrected Mean” of all the Lowest, (Col. 6), = *36.7*
Difference, or Mean Daily Range, = *12.3*
** Calculated Mean Temperature of Month, = *42.9*
S.-R. THERMOMETER, Black Bulb in Sun, Highest, (corrected for Index Errors), on the *16*th, = *60.3*
“Corrected Mean,” (Col. 7), of Black Bulb, Max. in Sun, = *49.0*
Lowest at Night, Black Bulb, (corrected for Index errors), on the *8*th, = *29.7*
“Corrected Mean,” (Col. 8), of Black Bulb, Min. on grass, = *36.7*
Difference of above Means or Range (“exposed”), = *12.3*

HYGROMETER, Mean (corrected) A.M. and P.M. Reading of Dry Bulb, (Cols. 9 and 11), = *46.7*

Mean (corrected) A.M. and P.M. Reading of Wet Bulb, (Cols. 10 and 12), = *46.0*

†† Computed Temperature of Dew-Point, = *46.0*

†† Do. Elastic Force of Vapour, = *46.0*

†† Do. Weight of Vapour in a Cubic Foot of Air, = *46.0*

†† Relative Humidity, (Saturation = 100), = *46.0*

RAIN fell on *20* Days; Amount in Inches, = *2.03*

WIND.		SUMMARY.									
Direction.		N	NE	E	SE	S	SW	W	NW	Calm or Variable.	Mean Force.
A.M.		8	5	2	2	3	4	1	5	0	1.17
P.M.		5	7	3	1	3	5	1	5	0	1.12
Mean.		6	6	3	2	3	4	1	5	0	1.15 = 1.3246,

Observations made and Return verified by *James Dale, Teacher in Robert Gordon's College, Aberdeen*

(Signed)

Greatest daily range = *20.3* on the *14*th

J. S. 714

SCOTTISH METEOROLOGICAL SOCIETY.

Observations taken at Gordon's College, Abdee, County of Aberdeen, in Lat. 57° 9' N, Long. 2° 6' W, Distance from Sea 1 miles.Height of Cistern of the Barometer above Mean Sea-level 66 feet, above Ground 2 1/2 feet.During the MONTH of May 1888.

The Hours of Observation are of Greenwich Time.

ELECTRICITY.	Days of Month.	BAROMETER.				SELF-REGISTERING THERMOMETERS. Read Daily, at 9 P.M.				HYGROMETER.				RAIN.		WIND.				CLOUDS.				SUNSHINE. Hours.	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 Ther- mometer	Barometer.	Attached Ther- mometer	Max. No.	Min. No.	Max. in Sun/shade	Min. on Grass.	Dry bulb.	Wet bulb.	Dry bulb.	Wet bulb.	No. of hours in which it fell.	Amount in inches.	Direction.	Force.	Direction.	Force.	Readings of the Hcup Anemometer. No. —	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.
		inches.	°	inches.	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°		°	°	°					°
	1	29.198	50.0	29.250	50.6	57.2	42.3							.10	S	1 1/2	S.W.	1 1/2	10	Nim	10	St	—							1		
	2	29.402	49.4	29.104	47.4	50.6	37.5							.07	S	1 1/2	S	1	9	cu-st	4	St	4							2		
	3	29.012	48.2	29.562	49.0	50.8	41.4							.06	S	1 1/2	N.W.	1 1/2	6	ci	10	St	—							3		
	4	29.880	50.4	29.878	48.0	53.7	36.0							—	N.W.	1	N.W.	1 1/2	2	ci	2	St	12							4		
	5	29.790	48.4	30.072	50.2	56.3	35.4							—	N.W.	2	N.W.	1 1/2	3	cu	—	—	12							5		
	6	30.024	56.0	29.916	63.0	63.2	38.5							—	S.E.	1 1/2	W	1 1/2	10	St	10	cu-st	4							6		
	7	29.890	58.6	29.824	57.2	64.5	46.5							—	W	1	W	1	6	cu-st	8	cu-st	11							7		
	8	29.846	52.6	30.104	51.0	55.2	45.7							—	N.W.	1 1/2	N.W.	2	4	cu	10	St	10							8		
	9	30.224	49.0	30.324	48.0	53.2	37.4							—	N	1 1/2	N	1 1/2	5	cu	5	St	11							9		
	10	30.376	48.5	30.438	49.0	54.2	35.7							—	N	1	N	1	7	cu	10	St	6							10		
	11	30.440	50.4	30.402	49.0	54.6	37.7							—	N	1 1/2	N	1	8	cu	2	St	8							11		
	12	30.344	52.4	30.440	52.8	57.4	37.9							.024	N	1 1/2	S.W.	1 1/2	10	cu-st	8	cu-st	10							12		
	13	29.912	53.0	29.874	52.4	53.2	43.7							.024	N.W.	2	N.W.	1	8	cu-st	5	ci-st	6							13		
	14	29.782	49.0	29.684	48.0	50.6	38.8							—	N	1 1/2	N	1	5	cu	10	cu-st	6							14		
	15	29.540	48.0	29.524	50.0	45.3	40.8							.01	S.W.	1	S	1	10	St	10	St	2							15		
	16	29.570	49.5	29.396	48.5	51.4	40.7							.29	S.W.	1	S.W.	1	10	St	10	St	—							16		
	17	29.254	52.0	29.348	51.6	57.4	42.8							—	S	1	S	1	6	cu	10	cu-st	8							17		
	18	29.592	52.6	29.680	52.7	55.4	45.3							.11	S.W.	1	S	1 1/2	10	cu-st	5	cu-st	6							18		
	19	29.724	52.6	29.670	52.4	55.2	46.8							.10	S.E.	1 1/2	S	1 1/2	9	cu-st	9	ci-cu	9			Thunder at 5.30 A.M.	Thunder and lightning 11.30 P.M. to 12.30		19			
	20	29.770	53.0	30.180	53.4	60.2	45.7							.04	S.E.	1	S.E.	1 1/2	10	cu-st	10	ci-cu	7							20		
	21	30.390	54.6	30.572	54.0	58.8	39.7							—	E	1 1/2	E	1 1/2	5	cu	—	—	14							21		
	22	30.540	53.4	30.542	52.0	57.3	36.8							—	S.E.	1 1/2	S.E.	1 1/2	8	ci-st	10	St	8							22		
	23	30.548	51.4	30.524	53.0	57.7	47.3							—	S.E.	1 1/2	S.E.	1 1/2	10	cu-st	2	ci	12							23		
	24	30.490	52.4	30.420	53.2	54.5	42.2							—	N	1 1/2	N	1 1/2	10	cu-st	6	St	6							24		
	25	30.316	52.3	30.210	50.0	54.2	39.2							—	N	1	N	1 1/2	9	cu-st	10	cu	1							25		
	26	30.404	52.4	29.966	51.2	51.6	40.6							.01	N	1	N	1 1/2	10	cu-st	3	ci-st	5							26		
	27	29.824	52.0	29.802	51.0	50.3	36.8							.02	N	1	N.E.	1	10	St	8	ci-cu	1							27		
	28	29.858	49.2	29.738	48.0	49.6	30.1							—	N.E.	1 1/2	E	1	9	cu	4	ci	10							28		
	29	29.974	49.6	29.772	48.1	51.0	30.7							.37	S.E.	1	S.E.	2	5	cu	10	cu-st	4							29		
	30	29.274	51.0	29.240	53.0	53.8	43.3							.02	S	1 1/2	S.W.	1 1/2	10	cu-st	10	cu	4							30		
	31	29.304	52.3	29.648	52.0	60.8	40.6							.04	S.W.	1	N.W.	2	6	cu	8	ci-st	8							31		
Sums.		1679	49	1619	155	1413	1516							1512	9	8		240	219	205												
Means.		29.881	51.5	29.905	51.3	56.3	40.1								1.06	1.05		7.7	7.1													
† Total Corrections for Instrumental Errors.		+0.06	-0.7	+0.06	-0.7										0.6	0.6																
† Corrections for Diurnal Range.																																
"Corrected Means."		29.887508		29.911506																												
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†† = 29.827
for Temp. (Col. 2), = 29.887 - 0.060 = 29.827
Corrected Mean" of Barometer at 9 P.M., minus the Correction†† = 29.852
for Temp. (Col. 4), = 29.911 - 0.059 = 29.852
Mean at Station, corrected, and at 32°, = 29.840
Correction for height, 66 feet above Mean Sea-level, = 0.074
Mean, reduced to 32°, and Sea-level, = 29.914
Highest Reading, corrected for Index errors, on the 23rd = 30.548
Lowest Do. Do. on the 3rd = 29.012
Difference, or Monthly Range, = 1.536

S.-R. THERMOMETER, (in shade, etc.), Highest in Month, (corrected for Index Errors), on the 7th, = 69.5
Lowest in Month, corrected for Index errors, on the 28th, = 30.1
Difference, or Monthly Range, = 39.4
"Corrected Mean" of all the Highest, (Col. 5), = 55.3
"Corrected Mean" of all the Lowest, (Col. 6), = 40.1
Difference, or Mean Daily Range, = 15.2
** Calculated Mean Temperature of Month, = 47.7

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), =

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

†† Computed Temperature of Dew-Point, =

†† Do. Elastic Force of Vapour, =

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

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

RAIN fell on 15 Days; Amount in Inches, = 1.29

WIND.		SUMMARY.					
Direction.		N	NE	E	SE	S	SW
A.M.		9	1	1	6	5	4
P.M.		7	1	2	4	5	4
Mean.		8	1	2	5	5	4

* 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.
†† Practically, though not absolutely a minus correction.
†† These "Hygrometrical Deductions" are calculated from Gish'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.

Observations made and
Return verified by

James Dale, Teacher in
Robert Gordon's College

(Signed)

Greatest daily range = 24.7 on the 6th

M.A. J.F.

SCOTTISH METEOROLOGICAL SOCIETY.

Observations taken at Gordon's College, County of Aberdeen, in Lat. 57° 9' N, Long. 2° 6' W, Distance from Sea 1 miles.

Height of Cistern of the Barometer above Mean Sea-level 66 feet, above Ground 2 1/2 feet.

During the MONTH of June 1888.

The Hours of Observation are of Greenwich Time.

ELECTRICITY.	Days of Month.	BAROMETER.		SELF-REGISTERING THERMOMETERS. Read Daily, at 9 P.M.				HYGROMETER.		RAIN.		WIND.				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 Balls.		Dry No. ——— Wet No. ———		9 h. A.M.		9 h. P.M.		9 h. A.M.		9 h. P.M.		9 h. A.M.																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																						
		Barometer.	Attached Thermometer.	Barometer.	Attached Thermometer.	Max. No.	Min. No.	Max. in Sun's rays No.	Min. on Grass. No.	Dry bulb.	Wet bulb.	Dry bulb.	Wet bulb.	No. of hours in which it fell.	Amount in inches.	No.	Direction.	Force.	No.	Direction.	Force.	No.					Direction.	Force.	No.	Direction.	Force.	No.	Direction.	Force.	No.	Direction.	Force.	No.	Direction.	Force.	No.	Direction.	Force.	No.	Direction.	Force.	No.	Direction.	Force.	No.	Direction.	Force.	No.	Direction.	Force.	No.	Direction.	Force.	No.	Direction.	Force.	No.	Direction.	Force.	No.	Direction.	Force.	No.	Direction.	Force.	No.	Direction.	Force.	No.	Direction.	Force.	No.	Direction.	Force.	No.	Direction.	Force.	No.	Direction.	Force.	No.	Direction.	Force.	No.	Direction.	Force.	No.	Direction.	Force.	No.	Direction.	Force.	No.	Direction.	Force.	No.	Direction.	Force.	No.	Direction.	Force.	No.	Direction.	Force.	No.	Direction.	Force.	No.	Direction.	Force.	No.	Direction.	Force.	No.	Direction.	Force.	No.	Direction.	Force.	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BAROMETER, “corrected Mean” at 9 A.M., minus the Correction†† for Temp. (Col. 2), = 29.912
 Corrected Mean” of Barometer at 9 P.M., minus the Correction†† for Temp. (Col. 4), = 29.916
 Mean at Station, corrected, and at 32°, = 29.914
 Correction for height, 66 feet above Mean Sea-level, = 0.074
 Mean, reduced to 32°, and Sea-level, = 29.988
 Highest Reading, corrected for Index error, on the 18 th, = 30.360
 Lowest Do. Do., on the 12 th, = 29.464
 Difference, or Monthly Range, = 0.896

S.-R. THERMOMETER, (in shade, etc.), Highest in Month, (corrected for Index Errors), on the 26 th, = 70.0
 Lowest in Month, corrected for Index errors, on the 4 th, = 30.0
 Difference, or Monthly Range, = 40.0
 “Corrected Mean” of all the Highest, (Col. 5), = 57.6
 “Corrected Mean” of all the Lowest, (Col. 6), = 43.4
 Difference, or Mean Daily Range, = 14.2
 ** Calculated Mean Temperature of Month, = 50.5
 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), =
 Mean (corrected) A.M. and P.M. Reading of Wet Bulb, (Cols. 10 and 12), =
 †† Computed Temperature of Dew-Point, =
 †† Do. Elastic Force of Vapour, =
 †† Do. Weight of Vapour in a Cubic Foot of Air, =
 †† Relative Humidity, (Saturation = 100), =
 RAIN fell on 11 Days; Amount in Inches, = 2.55

WIND.		SUMMARY.									
Direction.		N	NE	E	SE	S	SW	W	NW	Calm or Variable.	Mean Force.
A.M.		7	6	7	2	1	3	1	2	1	1.03
P.M.		4	8	6	3	5	0	0	3	1	0.90
Mean.		5	7	7	3	3	1	1	2	1	0.96 = 0.92

Observations made and Return verified by

(Signed) William C. Bale
Pro. James Bale

Greatest Daily Range
 = 25.0 on the 26 th

J. S.
MA.

SCOTTISH METEOROLOGICAL SOCIETY.

Observations taken at Gordon's College, County of Aberdeen, in Lat. 57° 9' N, Long. 2° 6' W, Distance from Sea 1 miles.

Height of Cistern of the Barometer above Mean Sea-level 66 feet, above Ground 2 1/2 feet.

During the MONTH of July 1888.

The Hours of Observation are of Greenwich Time.

ELECTRICITY.	Days of Month.	BAROMETER.				SELF-REGISTERING THERMOMETERS. Read Daily, at 9 P.M.				HYGROMETER.				RAIN.		WIND.				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.		No. of hours in which it fell.	Amount in inches.	9 h. A.M.		9 h. P.M.		Readings of the H. Cup Anemometer. No. _____ 9 h. A.M.	9 A.M.		9 P.M.		SUNSHINE. Hours.	9 h. A.M.										
		Barometer.	Attached Thermometer.	Barometer.	Attached Thermometer.	Max. No.	Min. No.	Max. in Sun-rays No.	Min. on Grass. No.	Dry bulb.	Wet bulb.	Dry bulb.	Wet bulb.			Direction.	Force.	Direction.	Force.		Velocity (0-6), and Dirac- tion.	Amount (0-10), and Species.	Velocity (0-6), and Dirac- tion.	Amount (0-10), and Species.		No. _____ 3 inches.						No. _____ 12 inches.	No. _____ 22 inches.			
		* No. _____	No. _____	No. _____	No. _____	No. _____	No. _____	No. _____	No. _____	No. _____	No. _____	No. _____	No. _____			No. _____	No. _____	No. _____	No. _____		No. _____	No. _____	No. _____	No. _____		No. _____						No. _____	No. _____	No. _____	No. _____	No. _____
		inches.	°	inches.	°	°	°	°	°	°	°	°	°			°	°	°	°		°	°	°	°		°						°	°	°	°	°
	1	29.932	53.7	29.976	53.0	57.2	47.4							.25	NW	1	8	1/2		10	cu-st	5	cu-st	4							1					
	2	29.870	50.0	29.622	57.0	54.0	44.0							1.02	SE	1/2	SE	1/2		10	st	10	Nim	—							2					
	3	29.332	52.8	29.342	54.4	50.1	48.0							.89	SE	1/2	N	1/2		10	Nim	10	Nim	—							3					
	4	29.338	53.0	29.376	54.4	53.5	47.2							.01	N	1/2	N	1/2		10	Nim	10	st	—							4					
	5	29.498	53.0	29.524	54.0	53.0	47.2							—	—	—	—	—		10	cu-st	10	st	1							5					
	6	29.746	53.3	29.864	52.2	52.3	42.6							—	N	1	N	1/2		10	cu-st	9	cu-st	1							6					
	7	29.936	54.0	29.950	54.5	57.8	53.0							—	NW	1	S	1/2		6	cu-st	—	—	7							7					
	8	29.896	55.2	29.816	59.0	63.1	46.6							.02	SE	1/2	SW	1/2		5	cu-st	8	cu-st	6							8					
	9	29.588	58.0	29.618	57.5	65.5	52.0							.07	S	1/2	NW	4		8	cu-st	9	cu	3							9					
	10	29.754	56.1	29.588	57.0	57.2	44.1							.75	NW	2	NW	1 1/2		3	cu	7	cu-st	2							10					
	11	29.770	56.2	29.846	56.0	53.3	43.9							.02	NW	2	N	1		10	st	10	st	—							11					
	12	29.916	53.0	29.992	54.2	60.5	47.3							.06	NW	2	NW	1		3	cu	3	cu-st	10							12					
	13	29.946	54.5	29.956	56.3	62.2	48.2							—	N	1/2	NW	1/2		10	Nim	10	st	—							13					
	14	29.952	53.4	29.924	56.6	63.0	57.1							—	NW	1/2	—	—		10	st-cu	10	st	3							14					
	15	29.860	56.0	29.768	55.2	55.5	50.8							.09	SE	1/2	SE	1/2		10	st-cu	10	st-cu	—							15					
	16	29.666	54.6	29.650	55.0	52.6	48.4							.01	SE	1/2	SE	1/2		10	Nim	10	st	—							16					
	17	29.604	54.0	29.670	55.0	57.3	50.0							.12	SE	1/2	SE	1/2		10	st	10	st	—							17					
	18	29.700	57.0	29.790	56.8	66.5	52.2							.01	—	—	NW	1/2		3	st	—	—	10							18					
	19	29.848	59.0	29.834	59.5	71.3	49.2							—	NW	1/2	SE	1/2		—	—	—	—	14							19					
	20	29.830	61.0	29.800	61.2	71.4	49.0							.03	—	—	—	—		—	—	—	—	13							20					
	21	29.744	54.0	29.736	52.0	52.2	50.0							.03	N	1/2	SE	1/2		10	st	10	st	—							21					
	22	29.706	53.0	29.622	57.0	57.3	50.2							.75	SE	1/2	SE	1/2		10	st	10	st	—							22					
	23	29.440	57.0	29.392	56.0	60.6	52.2							.39	SE	1/2	S	1		10	st	—	—	6							23					
	24	29.476	56.0	29.438	56.2	64.4	48.2							.01	S	1	S	1		8	cu-st	5	cu-st	9							24					
	25	29.536	56.0	29.500	57.2	64.3	52.1							—	SE	1/2	SE	1/2		—	—	8	cu-st	10							25					
	26	29.520	57.7	29.550	55.5	59.5	51.0							—	NW	1/2	NW	1/2		6	cu-st	10	cu-st	8							26					
	27	29.750	57.2	29.820	53.6	58.4	50.1							.02	SE	1/2	SE	1/2		5	cu-st	8	cu-st	7							27					
	28	29.776	54.1	29.810	53.5	56.2	46.9							.02	NW	1/2	NW	1/2		1	st	8	cu-st	9							28					
	29	29.820	56.0	29.740	55.9	56.4	47.2							—	NW	1/2	NW	1/2		—	—	—	—	12							29					
	30	29.692	53.1	29.742	57.0	55.3	43.1							—	NW	1/2	S	1		8	cu-st	10	st	5							30					
	31	29.768	57.0	29.862	58.2	60.6	42.2							.07	N	1	SW	1		3	cu-st	6	cu-st	6							31					
Sums.		2214.154	1214.9	167	1210	137								3.58	21	21.5				209	216	146														
Means.		29.715	55.3	29.715	55.6	58.4	48.2							21	0.68	0.69				6.7	7.0															
† Total Corrections for Instru- mental Errors.		+0.06	—	+0.06	—										0.6	0.6																				
‡ Corre- ctions for Diurnal Range.																																				
"Cor- rected Means."		29.721	54.6	29.721	54.9																															
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. " meteor.
ci-cu. cirro-cumulus.	n. nimbus.
ci-s. cirro-stratus.	r. rain.
cu. cumulus.	c. h. r. continued heavy rain.
cu-s. cumulo-stratus.	s. stratus.
d. dew.	sc. squall.
f. fog.	s. sleet.
fr. frost.	s. snow.
h.-fr. hoar-frost.	so. h. solar halo.
h. haze.	sq. squall.
h. d. heavy dew.	sq. squall.
h. l. hail.	sq. squall.
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. ha. 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†† = 29.651
 for Temp. (Col. 2), = 29.715 - .064 = 29.651
 Corrected Mean" of Barometer at 9 P.M., minus the Correction†† = 29.650
 for Temp. (Col. 4), = 29.715 - .065 = 29.650
 Mean at Station, corrected, and at 32°, = 29.651
 Correction for height, 66 feet above Mean Sea-level, = .074
 Mean, reduced to 32°, and Sea-level, = 29.725 29.716
 Highest Reading, corrected for Index error, on the 12 th, = 29.992
 Lowest Do. Do. on the 31 th, = 29.332
 Difference, or Monthly Range, = 0.660

S.-R. THERMOMETER, (in shade, etc.), Highest in Month, (corrected for Index Errors), on the 20 th, = 71.4
 Lowest in Month, corrected for Index errors, on the 31 th, = 42.2
 Difference, or Monthly Range, = 29.2
 "Corrected Mean" of all the Highest, (Col. 5), = 58.6
 "Corrected Mean" of all the Lowest, (Col. 6), = 48.2
 Difference, or Mean Daily Range, = 10.4
 * Calculated Mean Temperature of Month, = 53.4
 S.-R. THERMOMETER, Black Bulb in Sun, Highest, (corrected for Index Errors), on the th, =
 "Corrected Mean," (Col. 7), of Black Bulb, Max. in Sun, =
 Lowest at Night, Black Bulb, (corrected for Index errors), on the th, =
 "Corrected Mean," (Col. 8), of Black Bulb, Min. on grass, =
 Difference of above Means or Range ("exposed"), =

HYGROMETER, Mean (corrected) A.M. and P.M. Reading of Dry Bulb, (Cols. 9 and 11), =
 Mean (corrected) A.M. and P.M. Reading of Wet Bulb, (Cols. 10 and 12), =
 †† Computed Temperature of Dew-Point, =
 †† Do. Elastic Force of Vapour, =
 †† Do. Weight of Vapour in a Cubic Foot of Air, ... =
 †† Relative Humidity, (Saturation = 100), =
 RAIN fell on 21 Days; Amount in Inches, = 3.58

WIND.		SUMMARY.									
Direction.		N	NE	E	SE	S	SW	W	NW	Calm or Variable.	Mean Force.
A.M.		3	6	4	5	2	0	2	6	3	0.68
P.M.		4	3	5	5	4	2	0	5	3	0.69
Mean.		4	4	5	5	3	1	1	5	3	0.69 = 0.48

(Signed) pro James Sale
 (H.C.O.)

Greater daily range = 22.4 on the 20 th

J. S.
J. S.

Observations made and
 Return verified by

INSTRUCTIONS FOR TAKING METEOROLOGICAL

WITH REMARKS ON THE USE OF INSTRUMENTS.

Observations in connection with the periodical return of the seasons.

Observations, water, in cases where the observations cannot be taken daily, the observation may be made on the 5th, 15th, and 25th of each month.

3
July 1888

To the SECRETARY

Scottish Meteorological Society,

122 George Street,

EDINBURGH.

BOOK POST.

1888
JULY 4
EDINBURGH

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 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 water, and of the water being noted.

Mention what Test-Papers are used, Schönbien's or Mohr's, etc. 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 in connection with the force and direction of the wind at the time of observation, in the following manner:—thus 38° as an Ozone entry in the schedule will indicate that the Ozone paper is tinted as 3 on the scale, that the wind is from the N.W., and that its force on the scale 0—5 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 Electro-magnetic Record-Book, and the indications registered at 9 A.M. and 9 P.M. It is desired that these indications be registered in connection with the force and direction of the wind at the time of observation, in the following manner:—thus 38° as an Ozone entry in the schedule will indicate that the Ozone paper is tinted as 3 on the scale, that the wind is from the N.W., and that its force on the scale 0—5 is 4, or blowing fresh.

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 assigned. The use of contractions, ought, therefore, to be taken 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 Prevalent Diseases, differences in climate, 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, remarkable depressions, elevations, and fluctuations of the Barometer, and Storms and remarkable falls of Snow, Hail, or Rain the Hour of Storm, etc. Wind commencing, attaining their maximum, and ending, such notes on Storms as have been limited at above. We leave it to the Stationers to be recorded.

By the use of observations the use of the weather should be recorded, or riled off for the purpose, from the column of Storms.

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 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 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 repeating 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.

(By Order)
EDINBURGH, December 1887.

OBSERVATIONS IN CONNECTION WITH THE PERIODICAL RETURN OF THE SEASONS.

FOREST TREES.	In flower.	First appear.	In leaf.	Divided of leaves.	Chopped.	Barley, etc.	Planting.	In ear.	First Out.
Alder,									
Asp.									
Beech,									
Birch,									
Elm,									
Larch,									
Lime,									
Oak,									
Sycamore or Plane,									

Received Sept. 18th too late for
insertion in town's Return.
J.F.

SCOTTISH METEOROLOGICAL SOCIETY.

Observations taken at Gordon's College, Abdu, County of Aberdeen, in Lat. 57°49'N, Long. 2°6'W, Distance from Sea 1 mile.
Height of Cistern of the Barometer above Mean Sea-level 66 feet, above Ground 2½ feet. During the MONTH of August 1888.
The Hours of Observation are of Greenwich Time.

ELECTRICITY.	Days of Month.	BAROMETER.				SELF-REGISTERING THERMOMETERS. Read Daily, at 9 P.M.				HYGROMETER.				RAIN.		WIND.				CLOUDS.				SUNSHINE. Hours.	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.		No. of hours in which it fell.	Amount in inches. No.	9 h. A.M.		9 h. P.M.		Readings of the T.Cup Anemometer No. ——— 9 h. A.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's rays No.	Min. on Grass. No.	Dry bulb.	Wet bulb.	Dry bulb.	Wet bulb.			Dirac- tion.	Force	Dirac- tion.	Force		Velocity (0-6), and Dirac- tion.	Amount (0-10), and Species.	Velocity (0-6), and Dirac- tion.		Amount (0-10), and Species.	No. 3 inches.	No. 12 inches.					No. 22 inches.																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																								
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BAROMETER, "corrected Mean" at 9 A.M., minus the Correction†† = 29.788
for Temp. (Col. 2), = 29.866 - .078
Corrected Mean" of Barometer at 9 P.M., minus the Correction†† = 29.784
for Temp. (Col. 4), = 29.861 - .077
Mean at Station, corrected, and at 32°, = 29.786
Correction for height, 66 feet above Mean Sea-level, = .074
Mean, reduced to 32°, and Sea-level, = 29.860
Highest Reading, corrected for Index error, on the 16 th, = 30.260
Lowest Do. Do. on the 13 th, = 29.370
Difference, or Monthly Range, = 0.890

S.-R. THERMOMETER, (in shade, etc.), Highest in Month, (corrected for Index Errors), on the 25 th, = 69.1
Lowest in Month, corrected for Index errors, on the 18 th, = 35.1
Difference, or Monthly Range, = 34.0
"Corrected Mean" of all the Highest, (Col. 5), = 59.6
"Corrected Mean" of all the Lowest, (Col. 6), = 47.2
Difference, or Mean Daily Range, = 12.4
** Calculated Mean Temperature of Month, = 53.4
S.-R. THERMOMETER, Black Bulb in Sun, Highest, (corrected for Index Errors), on the th, =
"Corrected Mean," (Col. 7), of Black Bulb, Max. in Sun, =
Lowest at Night, Black Bulb, (corrected for Index errors), on the th, =
"Corrected Mean," (Col. 8), of Black Bulb, Min. on grass, =
Difference of above Means or Range ("exposed"), =

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

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

†† Computed Temperature of Dew-Point, =

†† Do. Elastic Force of Vapour, =

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

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

RAIN fell on 20 Days; Amount in Inches, = 2.39

WIND.		SUMMARY.									
Direction.		N	NE	E	SE	S	SW	W	NW	Calm or Variable.	Mean Force.
A.M.		6	7	2	1	0	10	4	1	6	1.00
P.M.		4	1	2	1	9	4	2	5	3	0.77
Mean.		5	2	1	1	9	4	2	5	2	0.89 = 0.79 ft.

Observations made and
Return verified by

James Dale, Teacher
Robert Gordon's College, Abdu

(Signed)

J.F. J.F.

TAKING METEOROLOGICAL

The Council of the Society resolved that the Self-Registering Thermometers, and the Dry and Wet Bulb Hygrometers, be kept in Stevenson's Louvre-boarded Box for the Thermometers, painted white inside and outside, and screwed to four stout posts, also painted white, firmly seated in the ground. The posts must be of such a length that the minimum Thermometers are hung in position the Bulbs of the Minimum Thermometers, and of the Dry and Wet Bulb Thermometers will be at the same height of four feet above the ground, the maximum Thermometer being hung immediately above the Minimum thermometer. The thermometer to be placed over a place of access, and in a free open space to which the sun's rays have free access, as much as the day's surrounding conditions enable the Observers to be stationed on cross-roads, or in the open country, or in the open air of the Box, and for the question of transparency be nearest upon the ground, and nearest to mercuric vapour Transparencies, as vital in every system of Meteorological Observation, since without it Observation made at different Stations are incompatible, thus rendering impossible to compare the Climates of places with each other as far as their most important features.

Stations made at different Stations are incomparable, thus rendering it impossible to compare the Climates of places with each other as to their most important features.

Professor Phillips, and Negretti and Zambra's Maximum Thermometers, and Rutherford's Minimum Thermometer are recommended. It is recommended that these Minimum Thermometers be graduated on the glass stem. The Thermometer is liable to two derangements—viz, the rupture of spirit breaking, and part of the spirit distilling by high temperature and lodging at the top of the tube. This derangement is of occasional occurrence with Protected Thermometers, but of frequent occurrence with exposed Thermometers. Hence a systematic examination of Minimum Thermometers ought to be a regular part of the work carried by each Observer.

Fortunately, Spirit Thermometers may be easily set right by any one, when the column of spirit chokes to separate. Let the thermometer be taken in the hand by the end farthest from the bulb, and then forcibly swing down towards the object being, on the principle of centrifugal force, to send down the detached portion of spirit till it unites with the column. A few throws, or swinging strokes, will generally be sufficient for the cure.

purpose; to allow the Thermometer should be placed in a slanted position, after the rest of the spirit shall adhering to the sides of the tube to drain down to the column. But another method must be adopted, if the portion of spirit in the top of the tube be small. That should be applied slowly and cautiously to the top end of the tube where the detached portion of spirit is, which, being turned over to vapor by the heat will condense on the surface of the unbroken column of spirit. Care must be taken that the heat is not applied too quickly; for, if be done, the tube will break and the instrument will be destroyed. If the heat is applied to the top of the tube, the spirit will be driven down, and the column of spirit down towards a glass flame from a gas-burner; or, if gas be not at hand, a piece of tapers may be used for the purpose.

The bulbs of the Thermometers for registering the greatest heat from sunbust rays, and the least from radiation

Black-Bulls. 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 chicken-rack boxes, whose sides protect the bulls 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 glass, 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-bulls enclosed in glass jackets* may also be used, being indubitably preferable to the naked ones. 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.

It must, however, be added, that the whole subject of the preservation of Solar and Terrestrial Radiation is not yet in a sufficiently advanced state to warrant the exclusive recommendation of any one of these methods.

ached; the frame must be such as will bring the tubes forward from any board on which it may be suspended; the water must be covered, and yet left open to the site, and a little over the level of the wet bulb, but in no case under the bulbs; the tub must be of medium fineness, and fastened at the neck of the tub by the cotton, which also supplies it with water. It must be put to ly the Observer that the muslin is always clean and moist, and that the water pure. In frosty weather, observation is a matter of delicacy, and must be made with great care. The bulb must be moistened by immersion from 15 to 30 minutes before the hour of observation. From the film of the thus formed evaporation will be seen from the wet cloth in ordinary circumstances.

In reading the Inermometer 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 Thermometer will be read—39.9, 40° 0, or again, 44.4, 40° 5, 40° 6, according as it indicates a little under, an exact coincidence, or a little over 40° or 40½°, respectively. No also

0° and 40°F . more or less must be registered 10°F . 2 or 40°C . 3, 4, 5, 6, 7, or 40° respectively. In reading Rutheford's Minimum thermometer, the indication of that end of the index which is next to the surface of the spirit is alone noted. On opening the Thermometer the Dry and Wet Bulb Thermometers are to be first, and thirdly, read, inasmuch as they are readily affected by heat from the person of the Observer.

On the Self-Registering Thermometers are read, since, in winter, at least, the extremes may occur at any hour; and it is necessary to give the observer the means of ascertaining the exact time of their occurrence to their proper meteorological day. In the ordinary thermometers, the indications registered on the 3d are those of the previous day, and the observations are made at 9 a.m. On the Self-Registering thermometers, the indications registered on the 3d are those of the previous day, and the observations are made at 9 a.m. On the 24, and extending 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 graduated on the stem, but merely on an attached scale, undergo repairs, they are very liable to be moved in 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 bulb of the Hygrometer. The freezing-point of each Thermometer, ascertained by a scratch on the tube, ought to be tested once a year, in winter or melting ice.

In selecting instruments, the following points require attention:—The divisions of the vernier of Barometers in reference to their scales, and the perfect freedom of the Barometer from air: the exact num-

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 might be taken for other, and greater depths, adding 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. R. R. R. The temperature of the water at the bottom of Wallaby, and the temperature of the water of the bottom of Wallaby, when practicable, to be taken, both the depth of the Temperature of Wall and of the water being noted.

Mention what Test-Papers are used, Schenk's or Moffatt's, etc.

Answers. 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 in connection with the force and direction of the wind at the observation, in the following manner:—thus 3 P.M. as an Ozene entry in the schedule will indicate that the Ozene paper is fastened on the scale, that the wind is from the N.W., and that its force on the scale is 4, or blowing fresh.

Too much importance cannot be attached to the electric condition of the atmosphere in connection with terrestrial magnetism, and the observations of the magnetic and meteorological phenomena generally. The Electric column is, in truth, necessary to every complete meteorological observatory.

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

Remarks.

assigned. The use of contractions, ought, therefore, to be taken very 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 Prevalent Diseases, differences in climate, colour, velocity, and direction, between the Lower and Upper Strata of Clouds, the Colour of the Skies, &c. Remarks ought to be made on the occurrence of Meteors, Auroræ, &c. Remarkable depressions, elevations, and fluctuations of the Barometre, Trunides-Storms, and remarkable fall-sof Snow, Hail, &c. In the Hour of Storms of Wind commencing, and during their

Printed at above. When lofty hills are in the vicinity of a Station, the Leight of Clouds and of the Snow-line in winter should be recorded

By the use of abbreviations in the title of the weather at 9 a.m. and P.M. should be registered either in two columns otherwise not supplied, 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 the 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; particular species of birds; and in the case of crops, to specified parts raised 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 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 afford him satisfaction.

[illegible][illegible][illegible]

In Leaf.	Divided of Leaves.	CR menthion
		Barley,
		Bere or
		Oats,
		Wheat,
		Beans,
		Peas,
		Potatoes,
		Turnips,
		Hy Cys Gra

[illegible]

	FOREST TREES.	
	lder,	.
	sch,	.
	rch,	.
	m,	.
	ach,	.
	ie,	.
	k,	.
	cannore or Plane,	.

Aberdeen
Aug. 1888

Aug. 1888

To the S

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EDINBURGH
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SECRETARY

Scottish Meteorological

122 G

(By Order) A. B.

turnips, brints, etc., whether plentiful, or in perfection; and the Agricultural condition of the district generally.

FOREST TREES.	In	First appear.	In leaf.	Divested of leaves.	CROPS,
Identy,					Barley, . . .
sh,					Bere or Bigg, . . .
ech,					Oats, . . .
rch,					Wheat, . . .
m,					Beans, . . .
rch,					Pease, . . .
me,					Potatoes, . . .
k,					Turnips, . . .
namore or Plane,					Rye Grass, . . .

SCOTTISH METEOROLOGICAL SOCIETY.

Observations taken at Gordon's College, County of Aberdeen, in Lat. 57° 9' N, Long. 2° 6' W, Distance from Sea 1 miles.
Height of Cistern of the Barometer above Mean Sea-level 66 feet, above Ground 2 1/2 feet. During the MONTH of September 1888.
The Hours of Observation are of Greenwich Time.

ELECTRICITY.	Days of Month.	BAROMETER.				SELF-REGISTERING THERMOMETERS. Read Daily, at 9 P.M.				HYGROMETER.				RAIN.		WIND.				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.		No. of hours in which it fell.		No. of inches.		9 h. A.M.		9 h. P.M.		Readings of the H. Cup Anemometer.		9 A.M.		F.M.					9 h. A.M.																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																	
		Barometer.	Attached Thermometer.	Barometer.	Attached Thermometer.	Max. No.	Min. No.	Max. in Sun-rays.	Min. on Grass.	Dry bulb.	Wet bulb.	Dry bulb.	Wet bulb.	No.	Direction.	Force.	No.	Direction.	Force.	No.	Direction.	Force.	No.	Direction.	Force.	No.					Direction.	Force.	No.	Direction.	Force.	No.	Direction.	Force.	No.	Direction.	Force.	No.	Direction.	Force.	No.	Direction.	Force.	No.	Direction.	Force.	No.	Direction.	Force.	No.	Direction.	Force.	No.	Direction.	Force.	No.	Direction.	Force.	No.	Direction.	Force.	No.	Direction.	Force.	No.	Direction.	Force.	No.	Direction.	Force.	No.	Direction.	Force.	No.	Direction.	Force.	No.	Direction.	Force.	No.	Direction.	Force.	No.	Direction.	Force.	No.	Direction.	Force.	No.	Direction.	Force.	No.	Direction.	Force.	No.	Direction.	Force.	No.	Direction.	Force.	No.	Direction.	Force.	No.	Direction.	Force.	No.	Direction.	Force.	No.	Direction.	Force.	No.	Direction.	Force.	No.	Direction.	Force.	No.	Direction.	Force.	No.	Direction.	Force.	No.	Direction.	Force.	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BAROMETER, "corrected Mean" at 9 A.M., minus the Correction for Temp. (Col. 2), = 30.0275
Corrected Mean of Barometer at 9 P.M., minus the Correction for Temp. (Col. 4), = 30.02137
Mean at Station, corrected, and at 32°, = 30.0274
Correction for height, 66 feet above Mean Sea-level, = 0.74
Mean, reduced to 32°, and Sea-level, = 30.098 30.076
Highest Reading, corrected for Index error, on the 8th, = 30.448
Lowest Do. Do., on the 30th, = 29.566
Difference, or Monthly Range, = 0.882

S.-R. THERMOMETER, (in shade, etc.), Highest in Month, (corrected for Index Errors), on the 12th, = 66.5
Lowest in Month, corrected for Index errors, on the 8th, = 36.5
Difference, or Monthly Range, = 30.0
"Corrected Mean" of all the Highest, (Col. 5), = 58.4
"Corrected Mean" of all the Lowest, (Col. 6), = 43.5
Difference, or Mean Daily Range, = 14.9
* Calculated Mean Temperature of Month, = 51.0
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), =
Mean (corrected) A.M. and P.M. Reading of Wet Bulb, (Cols. 10 and 12), =
Computed Temperature of Dew-Point, =
Do. Elastic Force of Vapour, =
Do. Weight of Vapour in a Cubic Foot of Air, =
Relative Humidity, (Saturation = 100), =
RAIN fell on 13 Days; Amount in Inches, = 1.97

WIND.		SUMMARY.									
Direction.		N	NE	E	SE	S	SW	W	NW	Calm or Variable.	Mean Force.
A.M.		6	3	3	2	2	5	4	5	0	0.85
P.M.		3	4	2	2	5	2	8	4	0	0.77
Mean.		5	3	3	2	3	4	6	4	0	0.81 = 0.66

Observations made and Return verified by James Dale, Teacher
Robert Gordon's College, Aberdeen

Greatest daily range = 23.9 on the 13th

(Signed) J. Fe.
J. Fe.

SCOTTISH METEOROLOGICAL SOCIETY.

Observations taken at Gordon's College, County of Aberdeen, in Lat. 57° 6', Long. 2° 9', Distance from Sea 1 miles.

Height of Cistern of the Barometer above Mean Sea-level 66 feet, above Ground 2 1/2 feet.

During the MONTH of October 1888.

The Hours of Observation are of Greenwich Time.

ELECTRICITY.	Days of Month.	BAROMETER.				SELF-REGISTERING THERMOMETERS. Read Daily, at 9 P.M.				HYGROMETER.				RAIN.		WIND.				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. <i>Mention the hour at which Storms, including Thunder and Lightning, began and ended.</i>	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.		Readings of the H. Cup Anemometer. No. — 9 h. A.M.	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.	Attach- ed Ther- mometer	Barometer.	Attach- ed Ther- mometer	Max. No.	Min. No.	Max. in Sun/shade.	Min. on Grass.	Dry bulb.	Wet bulb.	Dry bulb.	Wet bulb.			Direction.	Force.	Direction.	Force.		Velocity (0—6), and Dirac- tion.	Amount (0—10), and Species.	Velocity (0—6), and Dirac- tion.	Amount (0—10), and Species.		No. — 8 inches.	No. — 12 inches.								No. — 22 inches.								
		inches.	°	inches.	°																																						
		* No.		No.		No.	No.	No.	No.																																		
	1	29.526	47.2	29.358	48.0	44.3	34.2							30		N	1 1/2	N	1				5	cu	2	st	4						1										
	2	29.056	48.6	29.310	50.1	45.7	34.8							07		W	1	W	1/2				10	st	—	—	2						2										
	3	29.424	47.2	29.506	48.4	51.6	34.7							06		N.W.	1	N.W.	1				2	st	2	st	8						3										
	4	29.260	45.2	29.222	41.6	40.1	37.2							25		N.W.	1 1/2	N	2				10	Nm	10	st	2						4										
	5	29.214	42.0	29.524	47.0	45.7	31.0							13		N.W.	2 1/2	N.W.	1 1/2				5	ci-cu	10	st	4						5										
	6	29.812	47.4	29.904	46.5	44.3	35.8							03		N.W.	1 1/2	N.W.	1				5	cu	3	cu	5						6										
	7	29.484	45.2	30.150	47.2	46.7	34.3							—		N.W.	1	N.W.	1/2				10	st	10	cu-st	2						7										
	8	30.080	44.2	30.090	50.0	56.4	38.5							05		N.W.	1/2	N.W.	1/2				10	st	10	st	2						8										
	9	30.098	49.8	30.090	49.6	54.3	46.8							—		N.W.	—	N.W.	1/2				10	st	—	—	3						9										
	10	30.068	52.2	30.064	48.5	55.2	40.8							01		N.W.	1/2	N.W.	1				10	cu-st	10	st	4						10										
	11	29.988	50.1	29.658	51.0	53.7	39.8							08		N.W.	—	N.W.	—				10	cu-st	10	st	2						11										
	12	29.612	53.6	29.508	51.2	56.6	43.2							02		W	1	N.W.	3				10	ci-cu	2	cu	5						12										
	13	29.830	51.0	29.970	50.2	46.3	57.6							01		N.W.	1 1/2	N.W.	2				3	cu	5	ci-cu	7						13										
	14	29.962	46.1	29.932	51.2	53.2	42.9							—		W	1	W	1/2				6	ci	—	—	5						14										
	15	30.110	52.1	30.216	55.0	56.2	42.7							05		N.W.	1/2	W	1/2				5	ci	6	ci-cu	6						15										
	16	30.208	54.2	30.224	52.6	53.7	46.5							05		—	—	—	—				10	st	10	st	—						16										
	17	30.202	52.8	30.194	51.0	52.6	47.3							—		N.W.	1/2	W	1/2				10	ci-st	10	cu-st	2						17										
	18	30.182	53.2	30.110	52.6	50.1	47.7							—		W	1	S.W.	1				10	st	10	st	—						18										
	19	30.154	53.2	30.176	53.5	54.2	47.6							08		S.W.	1/2	S.W.	1/2				5	ci	10	st	3						19										
	20	30.364	54.2	30.422	53.8	52.6	45.1							01		N.W.	1/2	N.W.	—				10	st	10	st	—						20										
	21	30.576	51.4	30.504	52.0	48.3	41.6							—		N.W.	1/2	W	—				10	st	10	st	—						21										
	22	30.350	50.1	30.150	50.7	49.2	41.6							07		S.W.	1	S.W.	1/2				10	cu-st	10	ci-st	2						22										
	23	30.080	52.0	29.952	51.2	62.3	42.7							—		S.W.	1/2	S.W.	—				8	ci-cu	4	ci-st	6						23										
	24	29.870	51.5	29.814	52.0	58.2	40.1							17		S.W.	1/2	S.W.	1				7	ci-st	9	st	5						24										
	25	29.660	54.0	29.564	56.0	54.5	42.8							06		S.W.	1	S.W.	1/2				10	st	10	st	1/2						25										
	26	29.538	56.2	29.720	56.4	62.4	49.7							08		S.W.	1/2	W	1/2				6	ci-st	10	st	6						26										
	27	29.740	59.0	29.748	58.6	64.1	55.6							—		W	1 1/2	W	2				10	Nm	10	cu-st	1/2						27										
	28	29.604	53.2	29.520	57.4	60.6	53.2							04		S	1	S.	2 1/2				10	cu-st	—	—	1/2						28										
	29	29.786	54.5	29.844	48.2	54.1	43.8							—		W	1 1/2	W	—				—	—	2	st	5						29										
	30	29.742	54.5	29.844	45.2	52.7	38.8							05		W	1/2	S	1 1/2				9	ci-st	7	ci-st	1						30										
	31	29.742	57.4	29.490	57.0	57.7	44.5							—		S.W.	2	W	1 1/2				10	cu-st	2	st	4						31										
Sums.		18 1/4	16 10	14 8	13 8	13 12	16 16							16 1/2			28	2 1/2				246	204			96 1/2																	
Means.		29.869	51.3	29.865	57.0	52.6	42.0										090	089				7.9	6.6																				
+ Total Corrections for Instru- mental Errors.		x 0.06	-7	x 0.06	-7																																						
+ Correc- tions for Diurnal Range.																																											
"Cor- rected Means."		29.875	50.6	29.871	50.3																																						
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.	cirro-cumulus.	u.	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.	s.	snow.
h.	haze.	sol. h.	solar halo.
h. d.	heavy dew.	sq.	squall.
h. h.	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. ha.	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†† for Temp. (Col. 2), = 29.875 - 0.059 = 29.816

Corrected Mean" of Barometer at 9 P.M., minus the Correction†† for Temp. (Col. 4), = 29.871 - 0.058 = 29.813

Mean at Station, corrected, and at 32°, = 29.814

Correction for height, 66 feet above Mean Sea-level, = 0.074

Mean, reduced to 32°, and Sea-level, = 29.888

Highest Reading, corrected for Index error, on the 21 th, = 30.576

Lowest Do. Do., on the 2 th, = 29.056

Difference, or Monthly Range, = 1.460

S.-R. THERMOMETER, (in shade, etc.), Highest in Month, (corrected for Index Errors), on the 27 th, = 64.1

Lowest in Month, corrected for Index errors, on the 5 th, = 31.0

Difference, or Monthly Range, = 33.1

"Corrected Mean" of all the Highest, (Col. 5), = 52.8

"Corrected Mean" of all the Lowest, (Col. 6), = 42.0

Difference, or Mean Daily Range, = 10.8

** Calculated Mean Temperature of Month, = 47.3

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

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

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

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

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

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

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

†† Computed Temperature of Dew-Point, =

†† Do. Elastic Force of Vapour, =

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

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

RAIN fell on 24 Days; Amount in Inches, = 1.67

WIND.		SUMMARY.									
Direction.		N	NE	E	SE	S	SW	W	NW	Variable.	Mean Force.
A.M.		1	0	0	0	1	4	7	14	12	0.90
P.M.		2	0	0	0	2	6	9	11	1	0.89
Mean.		2	0	0	0	1	7	18	12	1	0.895 = 0.80 lbs.

* 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.

††† 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 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.

Observations made and
Return verified by

James Dale, Teacher in
Gordon's College

(Signed)

77.

77.

OBSERVATIONS,

ing of the scale of every instrument ; the rejection of Thermometers whose frameworks of which are not likely to stand exposure to weather, as shown in the past by repeated and annoying breakages ; the substitution of thermometers of similar construction ; and as regards 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 no right to have their instruments compared by the Secretary, and therefore with him regarding the purchase of instruments.

Very great care should be bestowed on the Observations of Wind. Force of wind, both as regards Direction and Force, is so essential towards the right decision of many other points connected with the science, that it would be well to elaborate upon this subject.

A Wind-vane should be elevated to the height of 19 feet above the ground, and placed in such a position that it shall not oscillate incessantly the whole day long, but rather remain steady in one direction, or mean direction should be taken. In all cases, but especially when the Vano is stationary, and when the wind is feeble, exposures must be made to the direction of smoke, etc., and also to the direction of clouds, and the observations are to be made on the changes in the direction of the wind ; and during rain, extra observation at every hour of Greenwhich. No Such

Careful observations are recommended to be made on the changes in the direction of the wind; and during the day, extra observations at every hour of Greenwich time. Such a system of continuous observation, pursued at different Stations, would be highly valuable and important results, particularly in connection with the system of thickly-planted Stations over a large district round Edinburgh called *Stroma Stations*, in the hope of being established by the Society for the systematic investigation of the relation of the force of the wind to *BAROMETRIC* elements, 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 it also gives the average force of the wind, and the *San Velocity* of the Wind at time of pressure.

observation may be ascertained. For inducing the force of the Wind at any particular hour of observation, the Pressure of the Atmosphere is to be regulated, by means of the Barometer, by Mr. T. Stevenson, the Honorary Secretary, and Mr. R. Ballingall, the Honorary Observer at Ellabakk, 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 observations, partly from the defective nature of the instruments used, and partly from the manner of observing. The Rain-Gauge should not be placed on a slope or terrace, but in a level piece of ground, in as open a situation as the Observer can secure it. As it is often difficult to obtain a position free and unobstructed by surrounding objects as is desirable, the Gauge may be taken to place it at some distance from shrubs, buildings, or other obstructions, at least as many feet from the base as they are in height. The more important directions in which it is most desirable to have a free exposure, are, in order of their importance, S.W., N.E., S.E., S. and W. The Gauge must be perfectly level and fixed so that it will

main level in all weathers, and be at a height of one foot above the ground, and over grass. In such gauges as Plowitt's, which are furnished with a measuring rod attached to a float, the rod ought to be fixed to the gauge, 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-gauge. 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. The Gauge is read once a month, the reading is to be made on the 1st 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 'Remarks'; the letter S affixed to the depth of water received in Gauge; the depth of the snow is to be measured in some open place where

drift is observed, and registered in addition to, as a check on the wind, the indications of the Rain-Gauge. For wind, rain, and snow, the Observer cannot be too careful to make his observations only, and nothing that partakes of the nature of conjecture or inference.

Convenient abbreviations for the nomenclature of Clouds will be found on the other side. The amount of Cloud ought to be estimated from the greater or less observation of sky overhead (i.e., within 50° or 30° of the zenith). The strata of Clouds that appear near the horizon are viewed obliquely; and, as being unable to judge of their amount we ought not to take them into account in the Clouds' column, though their appearance sometimes may be noted among the Remarks. The amount of rain is entered from a scale of 0 to 10; thus, when the sky overcast, it is free from Clouds it is entered 0; when half covered by Clouds, 5; and so on.

Observations of the Clouds are made at 9 A.M. and at sunset, ascertaining the condition and currents of the upper and lower regions of the atmosphere. The variations in the schedule are to be made in the same manner.

S. W. will indicate that the upper strata of Clouds travel with
following manner;—Thus, in the column velocity and Direction
W. will indicate that the lower regions from
with one-third the speed of the former. Again, in the second
4, s. will indicate that the higher
S. W. 2, cusi.
regions are covered to the amount of 4-tenths with stratus Clouds;
that the sky is further obscured to the extent of 2-tenths by
over Clouds of the cumulo stratus kind.

Remarks on peculiar Clouds, accompanied with drawings, will
remarkably in the development of a more exact nomenclature
Clouds, as well as throw light on the electrical, and other of the
obscure phenomena of Meteorology.

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

As the germination and growth of crops and plants generally depend greatly on the temperature of the soil—it being almost constant—the Council recommend that observations in this interesting department be made at A.M. by Thermometers permanently fixed in the soil, their bulbs being sunk to depths of 3, 7, 12, and 25 inches, and the stems above ground protected from the sun's rays and fitted with sloping funnels, to prevent rain water being conveyed to the bulbs by the stems or wooden frames.

A knowledge of the Temperature of the Soil is not only in itself important, but in its relations to that of our island, a most important branch of Meteorology. The Council therefore recommend that the Temperature of the Soil be carefully taken by a properly constructed apparatus, from books or papers which are so easily accessible, and which would otherwise be impracticable, from the ends of piers and rocks round the coast, where it is not influenced by that of river water; and as Hillebrand has shown that the temperature of the air over the sea is almost as possible by currents sweeping along the coast, and thus determining the temperature of the land, either greatly heated by the sun or cooled by nocturnal radiation. At or near the shore

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FOREST TREES.	In flower.	In first buds	In first appear.	In leaf.	Divided or Leaves.	CROPS, mentioning variety.
Alder,						Barley,
Bushy,						Bere or Bigg,
Hedge,						Oats,
Wheat,						Wheat,
Beans,						Beans,
Peas,						Peas,
Potatoes,						Potatoes, . . .
Turnips,						Turnips,
Rye Grass,						Rye Grass, . . .

ing of the scale of every instrument; the rejection of Thermometers, the frames of which are not likely to stand exposure to the weather, as shown in the past by repeated and annoying breakages; the rejection of all instruments of the kind of the Maximum Thermometers of similar construction, and as regards Maximum Thermometers, either Negretti and Zamboni's, or Phillips's, whether they will act at the highest temperatures they may be required to measure. By the laws of the Society, Members and Observers have the 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, and the accuracy 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 incessantly, the mean direction should be taken. In all cases, but especially when the Vane is stationary, and when the oscillations are feeble, reference may be made to the direction of the oak, etc.,

WIND.

As regards
Direction.

Careful observations are recommended to be made on the changes in the direction of the wind; and during such observations extra observations at every hour of Greenwich time. Such a system of continuous observation, pursued at different Stations, would furnish very valuable and important results, particularly in connection with the system of thickly-planted Stations over a large district round Edinburgh called STORM STATIONS, in the hope of being established by the Society for the systematic investigation of the relation of the force of the wind to BAROMETRIC PRESSURES, 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 also can calculate the annual Velocity of the Wind at time of observation.

As regards the Barometer, the Council have no objection to its use as a means of recording pressure.

observation may be ascertained. For inducing the force of the Wind at any particular hour of observation, the Pressure of the Atmosphere is to be regulated by the means of the Barometer, and the Force of the Wind by the means of the Fan. Mr. T. Stevenson, the Honorary Secretary, and Mr. R. Ballingall, the Honorary Observer at Ellabank, are recommended as likely to secure the 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 observations used partly from the defective nature of the instruments used, and partly from the want of uniformity in the manner of observing. Rain-Gauge should not be placed on a slope or terrace, but in a level piece of ground, in as open a situation as the Observer can secure it. As it is often difficult to obtain a position free and unobstructed by surrounding objects as is desirable, the Gauge may be taken to place it at some distance from shrubs, buildings, or other obstructions, at least as many feet from the base as they are in height. The more important directions in 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 Gauge must be perfectly level and fixed so that it will

main 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 in a firm position, and the float rise to its height only at the time the instrument is used, being found that a stem projecting above the rim of the glass, it seriously interferes with the proper measurement of the Rain-gauge. When a measuring glass is used, care should be taken to hold it perpendicular. The Rain-gauge ought to be read daily at 10 a.m., and the reading entered in the column of the previous day. The gauge should be placed in a level position, and the rim of the glass of the float, and the merit entered for the previous day. Snow-falls may, for convenience, be registered in the rain column, under the following conditions:—When a Snow-

Snow-fall.—If a shower occurs, it should be noted in the 'Remarks' column. The depth of the snow should be measured in some open place where the drift of the snow must be 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 make his own observations only; and nothing that partakes of the nature of deduction or inference.

Convenient abbreviations for the nomenclature of Clouds will be found on the other side. The amount of Cloud ought to be estimated from the greater or less observation of sky overhead (i.e., within 30° 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 Cloud's 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 over- and is free from Clouds it is entered 0, when half covered by Clouds, wholly covered, 10, and so on.

Observations of the Clouds are made at 9 A.M. and at sunset, as indicating the condition and currents of the upper and lower regions of the atmosphere. The entries in the schedule are to be made in

S. W. following manner:—Thus, in the column velocity and Direction
W. will indicate that the upper strata of Clouds travel with the
 prevailing velocity from S. W., and those in the lower regions from
 with one-third the speed of the former. Again, in the second
 4, $\frac{1}{4}$, $\frac{1}{2}$, $\frac{3}{4}$, $\frac{1}{2}$, $\frac{1}{4}$, $\frac{1}{8}$, will indicate that the higher
 2, $\frac{1}{2}$, $\frac{1}{4}$, $\frac{1}{8}$, $\frac{1}{16}$, $\frac{1}{32}$, $\frac{1}{64}$, $\frac{1}{128}$, $\frac{1}{256}$, $\frac{1}{512}$, $\frac{1}{1024}$, $\frac{1}{2048}$, $\frac{1}{4096}$, $\frac{1}{8192}$, $\frac{1}{16384}$, $\frac{1}{32768}$, $\frac{1}{65536}$, $\frac{1}{131072}$, $\frac{1}{262144}$, $\frac{1}{524288}$, $\frac{1}{1048576}$, $\frac{1}{2097152}$, $\frac{1}{4194304}$, $\frac{1}{8388608}$, $\frac{1}{16777216}$, $\frac{1}{33554432}$, $\frac{1}{67108864}$, $\frac{1}{134217728}$, $\frac{1}{268435456}$, $\frac{1}{536870912}$, $\frac{1}{1073741824}$, $\frac{1}{2147483648}$, $\frac{1}{4294967296}$, $\frac{1}{8589934592}$, $\frac{1}{17179869184}$, $\frac{1}{34359738368}$, $\frac{1}{68719476736}$, $\frac{1}{137438953472}$, $\frac{1}{274877906944}$, $\frac{1}{549755813888}$, $\frac{1}{1099511627776}$, $\frac{1}{2199023255552}$, $\frac{1}{4398046511104}$, $\frac{1}{8796093022208}$, $\frac{1}{17592186044416}$, $\frac{1}{35184372088832}$, $\frac{1}{70368744177664}$, $\frac{1}{140737488355328}$, $\frac{1}{281474976710656}$, $\frac{1}{562949953421312}$, $\frac{1}{1125899906842624}$, $\frac{1}{2251799813685248}$, $\frac{1}{4503599627370496}$, $\frac{1}{9007199254740992}$, $\frac{1}{18014398509481984}$, $\frac{1}{36028797018963968}$, $\frac{1}{72057594037927936}$, $\frac{1}{144115188075855872}$, $\frac{1}{288230376151711744}$, $\frac{1}{576460752303423488}$, $\frac{1}{1152921504606846976}$, $\frac{1}{2305843009213693952}$, $\frac{1}{4611686018427387904}$, $\frac{1}{9223372036854775808}$, $\frac{1}{18446744073709551616}$, $\frac{1}{36893488147419103232}$, $\frac{1}{73786976294838206464}$, $\frac{1}{147573952589676412928}$, $\frac{1}{295147905179352825856}$, $\frac{1}{590295810358705651712}$, $\frac{1}{1180591620717411303424}$, $\frac{1}{2361183241434822606848}$, $\frac{1}{4722366482869645213696}$, $\frac{1}{9444732965739290427392}$, $\frac{1}{18889465931478580854784}$, $\frac{1}{37778931862957161709568}$, $\frac{1}{75557863725914323419136}$, $\frac{1}{151115727451828646838272}$, $\frac{1}{302231454903657293676544}$, $\frac{1}{604462909807314587353088}$, $\frac{1}{1208925819614629174706176}$, $\frac{1}{2417851639229258349412352}$, $\frac{1}{4835703278458516698824704}$, $\frac{1}{9671406556917033397649408}$, $\frac{1}{19342813113834066795298816}$, $\frac{1}{38685626227668133590597632}$, $\frac{1}{77371252455336267181195264}$, $\frac{1}{154742504910672534362390528}$, $\frac{1}{309485009821345068724781056}$, $\frac{1}{618970019642690137449562112}$, $\frac{1}{1237940039285380274899124224}$, $\frac{1}{2475880078570760549798248448}$, $\frac{1}{4951760157141521099596496896}$, $\frac{1}{9903520314283042199192993792}$, $\frac{1}{19807040628566084398385987584}$, $\frac{1}{39614081257132168796771975168}$, $\frac{1}{79228162514264337593543950336}$, $\frac{1}{158456325028528675187087900672}$, $\frac{1}{316912650057057350374175801344}$, $\frac{1}{633825300114114700748351602688}$, $\frac{1}{1267650600228229401496703205376}$, $\frac{1}{2535301200456458802993406410752}$, $\frac{1}{5070602400912917605986812821504}$, $\frac{1}{10141204801825835211973625643008}$, $\frac{1}{20282409603651670423947251286016}$, $\frac{1}{40564819207303340847894502572032}$, $\frac{1}{81129638414606681695789005144064}$, $\frac{1}{162259276829213363391578010288128}$, $\frac{1}{324518553658426726783156020576256}$, $\frac{1}{649037107316853453566312041152512}$, $\frac{1}{1298074214633706907132624082305024}$, $\frac{1}{2596148429267413814265248164610048}$, $\frac{1}{5192296858534827628530496329220096}$, $\frac{1}{10384593717069655257060992658440192}$, $\frac{1}{20769187434139310514121985316880384}$, $\frac{1}{41538374868278621028243970633760768}$, $\frac{1}{83076749736557242056487941267521536}$, $\frac{1}{166153499473114484112975882535043072}$, $\frac{1}{332306998946228968225951765070086144}$, $\frac{1}{664613997892457936451903530140172288}$, $\frac{1}{1329227995784915872903807060280344576}$, $\frac{1}{2658455991569831745807614120560689152}$, $\frac{1}{5316911983139663491615228241121378304}$, $\frac{1}{10633823966279326983230456482242756608}$, $\frac{1}{21267647932558653966460912964485513216}$, $\frac{1}{42535295865117307932921825928971026432}$, $\frac{1}{85070591730234615865843651857942052864}$, $\frac{1}{170141183460469231731687303715884105728}$, $\frac{1}{340282366920938463463374607431768211456}$, $\frac{1}{680564733841876926926749214863536422912}$, $\frac{1}{13611294676837538538534984297270$

As the germination and growth of crops and plants generally depend greatly on the temperature of the soil—it is of the utmost importance to ascertain the amount and constancy—the Council recommend that observations in this interesting department be made.

Observations in this department permanently fixed in the soil, their bulbs or stems being sunk to depths of 3, 12, and 25 inches, and the stems above ground protected from the sun's rays and fitted with sloping funnels, to prevent rain water being conveyed to the bulbs by the stems or wooden frames.

A knowledge of the Temperature of the Soil is not only in itself important, but in its relations to that of our island, a most important branch of Meteorology. The Council therefore recommend that the Temperature of the Soil be carefully taken by a properly constructed apparatus, from books or papers, and that the observations be made at regular intervals, or at such times as it is impracticable from the ends of piers and rocks round the coast, where it is not influenced by that of river water, and as Hutton has observed, where it is not prevented by currents sweeping along the coast, and thus determining the temperature of the land, either greatly heated by the sun, or cooled by nocturnal radiation. At or near the shore, the

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[illegible]

ing of the scale of every instrument; the rejection of Thermometers, the frames of which are not likely to stand exposure to the weather, as shown in the past by repeated and annoying breakages; the rejection of all instruments of the kind of the Maximum Thermometers of similar construction, and as regards Maximum Thermometers, either Negretti and Zamboni's, or Phillips's, whether they will act at the highest temperatures they may be required to measure. By the laws of the Society, Members and Observers have the right to have their instruments compared by the Secretary, and to advise with him regarding the purchase of instruments.

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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 oscillations are feeble, reference may be made to the direction of the oak, etc.,

WIND.

As regards
Direction.

Careful observations are recommended to be made on the changes in the direction of the wind; and during the day, extra observations at every hour of Greenwich time. Such a system of continuous observation, pursued at different Stations, would be highly valuable and important results, particularly in connection with the system of thickly-planted Stations over a large district round Edinburgh called *Stora Stations*, in the hope of being established by the Society for the systematic investigation of the relation of the force of the wind to *BAROMETRIC* elements, 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 it also gives the mean Velocity of the Wind at time of observation, and the pressure.

observation may be ascertained. For inducing the force of the Wind at any particular hour of observation, the Pressure of the Atmosphere is to be regulated by the means of the Barometer recently brought under the notice of the Society, by Mr. T. Stevenson, the Honorary Secretary, and Mr. R. Ballingall, the Observer at Ellabakk, are recommended as likely to secure uniformity in making observations on the Force of the Wind. Many causes conspire to produce anomalies in Rain Returns, arising partly from the difficulty of obtaining a perfectly unobscurable situation for observations used partly from the defective nature of the instruments used, and partly from the defective nature of the instruments used. Rain-Gauge should not be placed on a slope or terrace, but in level piece of ground, in as open a situation as the Observer can secure it. As it is often difficult to obtain a position free and unobstructed by surrounding objects as is desirable, the Gauge may be taken to place it at some distance from shrubs, buildings, or other obstructions, at least as many feet from the base as they are in height. The more important directions in which it is most desirable to have a free exposure, are, in order of their importance, S.W., N.E., S.E., S. and W. The Gauge must be perfectly level and fixed so that it will

main level in all weathers, and be at a height of one foot above the snow, 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 in the snow, and the float rise to its height only at the time the instrument is used, being found that a stem projecting above the rim of the glass, it seriously interferes with the proper measurement of the Rain-gauge. When a measuring glass is used, care should be taken to hold it perpendicular. The Rain-gauge ought to be read daily at 10 a.m., and the reading entered in the column of the previous day. The gauge should be placed in a level position, and the rim of the glass of the float, and the merit entered for the previous day. Snow-falls may, for convenience, be registered in the rain columns, under the following conditions:—When a Snow-

Snow-fall.—If a shower occurs, it should be noted in the 'Remarks' column. The altitude to which the snow is carried by the wind, the depth of the snow must be measured in some open place where drifts are not likely to be formed. The direction of the wind, the drifts of the snow, and registered in addition to, and as a check upon, the indications of the Rain-Gauge. For wind, rain and snow, recorded in every column, the Observer cannot be too careful to make his own observations only; and nothing that partakes of the nature of deduction or inference.

Convenient abbreviations for the nomenclature of Clouds will be found on the other side. The amount of Cloud ought to be estimated from the greater or less observation of sky overhead (i.e., within 30° 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 Cloud's 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 over- and is free from Clouds it is entered 0, when half covered by Clouds, wholly covered, 10, and so on.

Observations of the Clouds are made at 9 A.M. and at sunset, ascertaining the condition and currents of the upper and lower regions of the atmosphere. The entries in the schedule are to be made in

S. W. will indicate that the upper strata of Clouds travel with
following manner;—Thus, in the column velocity and Direction
W. will indicate that the lower regions from
with one-third the speed of the former. Again, in the second
4, s. will indicate that the higher
S. W. 2, cusi.
regions are covered to the amount of 4-tenths with stratus Clouds;
that the sky is further obscured to the extent of 2-tenths by
over Clouds of the cumulo stratus kind.

Remarks on peculiar Clouds, accompanied with drawings, will
remarkably in the development of a more exact nomenclature
Clouds, as well as throw light on the electrical, and other of the
obscure phenomena of Meteorology.

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

As the germination and growth of crops and plants generally depend greatly on the temperature of the soil—it is of the utmost importance to ascertain the amount and constancy—the Council recommend that observations in this interesting department be made.

Observations in this department permanently fixed in the soil, their bulbs or stems being sunk to depths of 3, 12, and 25 inches, and the stems above ground protected from the sun's rays and fitted with sloping funnels, to prevent rain water being conveyed to the bulbs by the stems or wooden frames.

A knowledge of the Temperature of the Soil is not only in itself important, but in its relations to that of our island, a most important branch of Meteorology. The Council therefore recommend that the Temperature of the Soil be carefully taken by a properly constructed apparatus, from books or other sources, and that the results be published, so that the impracticable, from the ends of piers and rocks round the coast, where it is not influenced by that of river water, and as Hillebrand has pointed out, where it is not affected by the prevailing wind, may be used as possible by currents sweeping along the coast, and thus determining the temperature of the land, either greatly heated by the sun, or cooled by nocturnal radiation. At or near the coast, the

SCOTTISH METEOROLOGICAL SOCIETY.

Observations taken at Gordon's College, Abdee County of Abdee, in Lat. 57° 9', Long. 2° 6', Distance from Sea 1 mile.

Height of Cistern of the Barometer above Mean Sea-level 66 feet, above Ground 2 1/2 feet.

During the MONTH of November 1888.

The Hours of Observation are of Greenwich Time.

ELECTRICITY.	Days of Month.	BAROMETER.				SELF-REGISTERING THERMOMETERS. Read Daily, at 9 P.M.				HYGROMETER.				RAIN.		WIND.				CLOUDS.				SUNSHINE. Hours.	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.		No. of hours in which it fell.	Amount in inches.	9 h. A.M.		9 h. P.M.		Readings of the H. Cup Anemometer. No. —	9 h. A.M.	9 A.M.			P.M.		9 h. A.M.						Temperature of WELL at depth of feet. No.	Temperature at 1 fathom and Density.	9 A.M. 9 P.M.		
		Barometer. * No.	Attached Thermometer	Barometer. No.	Attached Thermometer	Max. No.	Min. No.	Max. in Sun/rays	Min. on Grass.	Dry bulb.	Wet bulb.	Dry bulb.	Wet bulb.			Direction.	Force.	Direction.	Force.			Velocity (0—10), and Species.	Amount, (0—10), and Species.		Velocity (0—10), and Direction.	Amount, (0—10), and Species.	No. 1 inches.									No. 2 inches.	No. 3 inches.
	1	29.644	49.5	29.890	48.2	47.2	37.6							.20	N.W.	1	N.E.	1 1/2			10	cu-lt	2	st	2					1							
	2	29.928	52.0	29.952	51.4	48.2	40.7							—	S.W.	1	N.E.	1 1/2			5	cu-lt	10	cu-st	2					2							
	3	29.966	48.2	29.972	51.2	46.2	42.5							.01	E	1	E	1			6	cu	10	st	—					3							
	4	29.964	47.2	29.994	47.5	45.2	41.8							.09	E	1	E	1 1/2			10	cu-st	10	st	—					4							
	5	30.040	51.0	30.132	50.0	47.1	42.3							.01	S.E.	1	S.E.	1			10	st	10	st	—					5							
	6	30.172	49.7	30.126	45.0	45.3	43.4							.02	S	1 1/2	S	1			10	st	10	st	—					6							
	7	30.090	50.2	30.020	45.2	44.2	40.4							.10	S.E.	1	S.E.	2			10	cu-st	10	st	—					7							
	8	30.012	48.5	30.032	45.2	45.6	40.8							—	S.	1 1/2	S.	2			10	st	5	cu-st	—					8							
	9	30.026	49.0	30.072	49.0	43.8	40.5							—	S	1 1/2	E	2			10	cu-st	10	cu-st	1					9							
	10	29.880	47.4	29.770	46.4	46.4	43.7							.16	S.E.	2	S.E.	3			9	cu-st	10	st	—					10							
	11	29.804	48.4	29.858	50.2	47.4	44.7							.02	S.E.	1 1/2	S.E.	1 1/2			10	cu-st	10	st	—					11							
	12	29.832	49.2	29.676	49.8	47.3	44.2							.29	S.E.	1	S.	2			8	cu-lt	10	st	—					12							
	13	29.582	49.6	29.502	50.6	45.1	43.9							.84	S	2 1/2	S	2 1/2			10	Nim	1	st	—					13							
	14	29.496	51.6	29.728	50.2	55.2	44.1							.02	S.W.	1 1/2	S.W.	1			6	cu-lt	1	st	4					14							
	15	29.620	51.6	29.854	50.4	54.3	40.6							.34	S.W.	1 1/2	W	1			10	Nim	10	st	4					15							
	16	29.146	54.0	29.452	50.2	55.7	44.2							.01	S	4	S.W.	2			9	cu	—	—	5					16							
	17	29.264	48.2	29.520	49.0	44.3	38.6							—	W	1 1/2	W	1			10	cu-lt	8	cu-st	3					17							
	18	29.570	48.0	29.326	49.0	47.2	39.5							.01	S.W.	1	S.W.	1			10	cu-lt	1	st	—					18							
	19	29.320	51.2	29.240	46.0	58.2	39.3							.08	W	1	W	1			5	st	—	—	2					19							
	20	29.146	48.0	29.346	44.2	39.1	34.8							.39	W	1	W	2			10	st	10	Nim	2					20							
	21	29.590	45.8	29.854	44.1	40.6	33.5							.13	N.W.	1	N.W.	1			10	st	10	st	4					21							
	22	29.404	51.6	29.502	50.1	58.2	40.2							.07	S.W.	1	S.W.	1 1/2			10	cu-lt	4	cl	—					22							
	23	29.604	50.0	29.620	48.0	47.2	40.5							.22	W	1 1/2	W	1			2	st	10	st	1					23							
	24	29.496	47.2	29.490	48.2	52.2	36.8							.16	W	1	W	1 1/2			10	st	10	Nim	3					24							
	25	29.170	50.2	29.034	50.0	54.2	37.6							.04	S	1 1/2	S	2 1/2			10	cu	—	—	—					25							
	26	29.070	49.0	29.390	40.1	41.7	37.6							—	S.W.	1 1/2	W	1			2	st	—	—	1 1/2					26							
	27	29.368	41.4	29.190	40.8	41.6	27.4							.45	N.W.	1 1/2	S.E.	2 1/2			10	st	10	Nim	—					27							
	28	29.364	41.2	29.580	40.8	38.6	32.5							.01	N.W.	1	N.E.	1			10	cu-st	10	cu	—					28							
	29	29.590	43.2	29.484	46.2	39.2	30.4							.11	E	1 1/2	S.E.	2			10	cu-lt	10	cu-lt	4					29							
	30	29.454	49.2	29.490	48.2	43.2	36.8							.06	S.E.	1	S	1 1/2			10	st	10	st	—					30							
	31																														31						
	Sum.	168	168	168	168	168	168							25	3 1/2	385	145			262	212	385															
	Means.	168	168	168	168	168	168							128	138					8.4	7.1																
	† 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-on. 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.	s. snow.
h. haze.	so. ha. solar halo.
h. d. heavy dew.	sq. squall.
h. l. hail.	sq. s. squalls.
l. lightning.	t. thunder.
l. cl. light clouds.	t. s. thunder storm.
l. sh. light showers.	w. wind.
lu. co. lunar corona.	g. gale of wind.
lu. lu. 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†† = 29.667
 for Temp. (Col. 2), = 29.667 — 0.54 = 29.127
 Corrected Mean” of Barometer at 9 P.M., minus the Correction†† = 29.667
 for Temp. (Col. 4), = 29.667 — 0.54 = 29.127
 Mean at Station, corrected, and at 32°, = 29.59324/605
 Correction for height, 66 feet above Mean Sea-level, = 0.074
 Mean, reduced to 32°, and Sea-level, = 29.667
 Highest Reading, corrected for Index error, on the 6 th, = 30.172
 Lowest Do. Do., on the 25 th, = 29.054
 Difference, or Monthly Range, = 1.118

S.-R. THERMOMETER, (in shade, etc.), Highest in Month, (corrected for Index Errors), on the 10 th, 42.2 = 58.2
 Lowest in Month, corrected for Index errors, on the 27 th, = 27.4
 Difference, or Monthly Range, = 30.8
 “Corrected Mean” of all the Highest, (Col. 5), = 47.0
 “Corrected Mean” of all the Lowest, (Col. 6), = 39.4
 Difference, or Mean Daily Range, = 7.6
 * Calculated Mean Temperature of Month, = 43.2
 S.-R. THERMOMETER, Black Bulb in Sun, Highest, (corrected for Index Errors), on the th, =
 “Corrected Mean,” (Col. 7), of Black Bulb, Max. in Sun, =
 Lowest at Night, Black Bulb, (corrected for Index errors), on the th, =
 “Corrected Mean,” (Col. 8), of Black Bulb, Min. on grass, =
 Difference of above Means or Range (“exposed”), =

HYGROMETER, Mean (corrected) A.M. and P.M. Reading of Dry Bulb, (Cols. 9 and 11), =
 Mean (corrected) A.M. and P.M. Reading of Wet Bulb, (Cols. 10 and 12), =
 ‡ Computed Temperature of Dew-Point, =
 ‡ Do. Elastic Force of Vapour, =
 ‡ Do. Weight of Vapour in a Cubic Foot of Air, =
 ‡ Relative Humidity, (Saturation = 100), =
 RAIN fell on 25 Days; Amount in Inches, = 3.75

WIND. SUMMARY.											
Direction.	N	NE	E	SE	S	SW	W	NW	Calms or Variable.	Mean Force.	Mean Velocity in miles per day.
A.M.	0	0	4	6	6	5	5	4	0	128	
P.M.	0	3	3	6	6	4	7	1	0	138	
Mean.	0	2	3	6	6	5	6	2	0	133	1.77 lbs.

* 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.
 † Emending 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.

Observations made and Return verified by James D. L. Teacher in Robert Gordon's College, Abdee

(Signed)

James D. L.

J. D. L.

INSTRUCTIONS FOR TAKING METEOROLOGICAL

WITH REMARKS ON THE USE OF INSTRUMENTS.

OBSERVATIONS,

One of the chief objects that the Scottish Meteorological Society proposed to itself when the Society was established in 1855, was to secure PERFECT UNIFORMITY in the system of observation pursued at all its Stations. Uniformity in the system of 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 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 fall 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, at all the Stations of the columns of the Society. 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.

Weather-Glasses and Aneroids, though well-suited to indicate roughly variations of atmospheric pressure, are not fitted for scientific purposes. No Barometer should be used for Meteorological Observation that is not supplied with some means of adjustment or compensation which will secure that the height of the mercury in the tube is accurately measured from the fluctuating surface of the mercury in the cistern.

The Barometer in which the error arising from the fluctuating surface of the mercury in the cistern is entirely got rid of is FORTIN'S Barometer, the arrangement consisting in applying pressure by means of a screw to the bottom of the cistern, which is made of flexible leather, thus raising or depressing the surface till it just meets the ivory point which forms the zero point of the fixed scale.

The Barometer originally constructed by Mr. Adie of London, and usually called the Board of Trade Barometer, has the great convenience of requiring no adjustment of the cistern. Its scale-inches are not true 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 a few cases in setting the instrument to the zero point of the fixed scale when the light is not good. To show the accuracy with which these Barometers are made, it may be stated 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.

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 white ivory float, whose stem passes freely through the lid and case of the cistern. When the index-line into this little passage is brought, by the adjusting screw, to form one straight line with those on every other part of the surface of the mercury is then at the exact height, and the reading 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 neither the sun's direct rays nor 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 observers' 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 unfrequently 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 most frequently made in reading the Barometer are errors of 1/1000 inch, 0.000 inch, and 0.050 inch; that is to say, instead of 29.86 inches, either of the following is sometimes set down—viz., as 30.865 inches, 28.865 inches, 29.865 inches, or 29.815 inches. Experience having shown that even the very best Observers make these mistakes, particular attention is directed to the matter.

When a Barometer, having adjustable surfaces has to be removed from its fastenings, the peg must first be screwed so as to form a tight plug to the cistern, thus preventing the escape of the mercury. Then screw up the cistern, the peg must be removed, and the instrument; it should then be carried with the cistern upmost. Before suspending the Barometer for use, it must be ascertained whether the space above the mercury in the tube is a complete vacuum; this is the case if, on inclining the instrument, a sharp tap is produced when the mercury strikes the top of the tube. If a dull tap is heard, there is air in the tube, which must be got rid of.

As Barometers are liable to be damaged by the introduction of air into their tubes, on removal from place to place, or in being roughly handled, it may be useful to Observers to know how the tube 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 untwisting 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 Louver-boarded Box for Thermometers of similar construction; and as regards Maximum Thermometers, either Negretti's and Zanbini's, or Phillips's, whether they will act at the highest temperature 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, the accuracy 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 inausurably, 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., in well-exposed situations. Careful observations are recommended to be made on the changes in the direction of the wind; and during storms, extra observations at every hour of Greenwich time. Such a system of simultaneous observation, pursued at different Stations, is likely to give highly valuable and important results, particularly in connection with the system of thickly-planted Stations over a limited district round Edinburgh called STONAR STATIONS, in the course of the establishment of the Society for the systematic investigation of the relation of the force of the wind to Barometrical GRADES, 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 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 Anemometer recently made under the notice of the Society by Mr. T. S. Hutton, the Secretary, and Mr. R. Ballingall, the Society's Observer at Edinburgh, is recommended as likely to secure uniformity in making observations of the Force of the Wind.

Many causes conspire to produce the error in Rain Returns, arising yearly from the difficulty of obtaining a perfectly unobscured 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 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 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-shower occurs, it should be noted in the 'Remarks,' 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 indicated in every column, the Observer cannot be too careful to register observations only; and nothing that partakes of the nature of Deduction or Inference.

Conventional abbreviations for the nomenclature of Clouds will be found in the following table. The amount of Cloud ought to be estimated (6/10 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, 6, S. W.

2, 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 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.

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 fired 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, a most important branch of Meteorology. The Council therefore recommend that the Temperature of the Sea be carefully taken by a properly constructed apparatus, on boats or steamers, from the ends of the fore and main masts, and as little as possible, where it is not influenced by that of the river, coast, and tide, influenced as possible by currents sweeping along the coast, and thus acquiring the temperature of the land, either gently heated by the sun or cooled by nocturnal radiation. At or near the time of High

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, either Negretti's and Zanbini's, or Phillips's, whether they will act at the highest temperature 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, the accuracy 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 inausurably, 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., in well-exposed situations. Careful observations are recommended to be made on the changes in the direction of the wind; and during storms, extra observations at every hour of Greenwich time. Such a system of simultaneous observation, pursued at different Stations, is likely to give highly valuable and important results, particularly in connection with the system of thickly-planted Stations over a limited district round Edinburgh called STONAR STATIONS, in the course of the establishment of the Society for the systematic investigation of the relation of the force of the wind to Barometrical GRADES, and other points connected with storms.

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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 possible, extra Observations might be taken for other and greater depths. It is also very desirable that observations on the Hore of Obsevation, which is the most commonly known, be instituted at points along the coast by the authority of Mr. T. Stevenson, and already commenced at Portoford and Liverpool.

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

Mention what Test-Papers are used, Schönbain's or Mohr's, etc. The Paper is alkali 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 in connection with the force and direction of the wind at the time of observation, in the following manner:—thus 35°W., as an Ozon entry in the schedule will indicate that the Ozon paper is tinted as 3 on the scale, that the wind is from the N.W., and that its force on the scale 0—5 is 4, or blowing fresh.

Too much importance can 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 unavoidably too narrow. Some of the most valuable Observations that can be taken are those for which no rules can be given nor bonus assigned. The use of contrivances, ought, therefore, to be taken 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 Precipitation, 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, Thunder-Storms, 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 unnecessary, 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 connection with the Agricultural, Horticultural, and Natural History. The Periodic Return of the Seasons, and 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 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 rejecting 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.

(By Order)

EDINBURGH, December 1884.

OBSERVATIONS IN CONNECTION WITH THE PERIODICAL RETURN OF THE SEASONS.

FOREST TREES.	Alder,	Ash,	Beech,	Birch,	Elm,	Larch,	Limber,	Oak,	Sycamore or Plane,
In Flower.									
In Leaf.									
Discovered of mentioning variety.									
Barley,									
Bare or Bigg,									
Oats,									
Wheat,									
Beans,									
Potatoes,									
Turnips,									
Rye Grass,									
First Out									
In Flower.									
Or in Flower.									
Appearing									
Soiling or above Ground.									
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Bare or Bigg,									
Oats,									
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SCOTTISH METEOROLOGICAL SOCIETY.

Observations taken at Gordon's College, Aberdeen County of Aberdeen, in Lat. 57° 9' N Long. 2° 6' W. Distance from Sea 1 miles.Height of Cistern of the Barometer above Mean Sea-level 66 feet, above Ground 2 1/2 feet.During the MONTH of December 1888.

The Hours of Observation are of Greenwich Time.

ELECTRICITY.	Days of Month.	BAROMETER.				SELF-REGISTERING THERMOMETERS. Read Daily, at 9 P.M.				HYGROMETER.				RAIN.		WIND.				CLOUDS.				SUNSHINE. Hours.	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.		No. of hours in which it fell.	Amount in inches.	9 h. A.M.		9 h. P.M.		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.	9 h. A.M.						Temperature of Well, at depth of feet, No. ——— Temperature at 1 foot, and Dew-Point.	9 A.M. 9 P.M.																
		Barometer. * No. ———	Attach- ed Ther- mometer No. ———	Barometer. No. ———	Attach- ed Ther- mometer No. ———	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							No. 3 inches. No. 12 inches. No. 22 inches.																							
																										inches.	°							inches.	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°
1	29.454	49.2	29.390	48.2	46.1	32.7							.07	S.E.	1	S.W.	1		6	ci-cu	10	st	4								1																		
2	29.594	46.0	29.540	47.0	45.3	37.4							.33	S.W.	1/2	—	—		10	ci-st	2	cu	—									2																	
3	29.348	46.5	29.260	47.0	51.2	32.5							.06	S	1	S	1/2		10	ci-st	10	cu	—									3																	
4	29.616	50.0	29.820	53.0	52.4	48.1							.06	W	1/2	W	1/2		5	ci	2	cu	1									4																	
5	29.798	53.0	29.826	52.8	51.2	44.7							.06	S.W.	1	S.W.	1		10	st	2	cu	—									5																	
6	29.984	52.5	29.872	53.0	50.8	44.2							.07	S.W.	1/2	S.W.	1		3	st	6	ci-st	2									6																	
7	29.726	52.6	29.704	53.2	49.2	43.7							—	W	1	W	1/2		2	st	10	st	2									7																	
8	29.978	48.0	29.902	46.0	42.3	32.4							—	W	1	W	1/2		4	ci-cu	2	st	4									8																	
9	30.086	46.2	30.190	45.2	42.1	31.4							—	W	1/2	W	1		1	st	2	st	5									9																	
10	30.272	43.2	30.218	37.3	38.2	31.1							—	W	1	S.W.	1/2		5	cu	—	—	4									10																	
11	30.162	45.0	30.084	44.0	41.3	27.5							—	S.W.	1/2	S.W.	1/2		6	cu	10	ci-st	1									11																	
12	30.126	46.5	30.112	44.0	40.7	33.4							—	S.W.	2	S.W.	1		8	ci-cu	6	cu	4									12																	
13	30.136	48.0	30.084	47.5	42.3	36.8							—	S.W.	1/2	W	1		10	cu	10	cu	—									13																	
14	30.008	47.2	30.180	44.2	43.7	36.5							—	S.W.	1/2	S.W.	1/2		10	st	2	ci-st	—										14																
15	30.242	46.2	30.190	46.3	46.2	38.3							—	S.W.	1	S.W.	1/2		6	ci-st	10	ci-st	4										15																
16	30.168	47.2	30.040	46.4	49.2	37.3							—	W	1/2	W	—		6	ci-st	—	—	1/2										16																
17	30.008	46.5	30.060	47.2	50.2	38.3							—	W	—	S.W.	2		5	ci-st	8	st	4										17																
18	29.940	47.2	29.728	44.2	37.6	31.4							—	S.W.	1	S.W.	1/2		10	st	10	st	3										18																
19	29.538	46.5	29.528	49.2	48.3	31.7							.02	S.W.	1	S.W.	2		10	st	10	Nim	—										19																
20	29.440	50.0	29.248	49.2	47.3	39.8							.27	S.E.	1 1/2	S.E.	2		10	st	10	Nim	—										20																
21	29.172	51.0	29.048	50.2	46.5	41.8							.20	S.E.	1 1/2	S.E.	1		10	st	10	st	—										21																
22	29.182	49.0	29.326	48.5	45.7	43.8							.19	S	1/2	S	—		10	Nim	10	st	—										22																
23	29.464	48.2	29.332	49.2	46.3	41.8							.16	S	1/2	S.W.	2		5	ci-st	10	st	—										23																
24	29.094	48.5	29.248	49.0	44.2	42.7							—	S.W.	1	W	1		8	ci-st	2	st	—										24																
25	29.420	38.0	29.010	47.0	42.8	28.7							.25	N.W.	1/2	S.W.	1		2	st	10	Nim	—										25																
26	29.380	40.5	29.504	44.3	38.2	32.7							—	W	1	W	—		1	st	2	st	—										26																
27	29.492	46.2	29.190	43.5	42.3	28.7							.09	S	1	S.W.	—		10	ci-st	10	st	—										27																
28	29.212	47.2	29.524	44.0	40.3	31.1							.01	S.W.	1	N.W.	1		3	ci-st	2	st	—										28																
29	29.870	47.4	29.932	42.4	37.4	26.8							—	N.W.	1/2	W	1/2		3	cu	2	ci-st	—										29																
30	30.024	39.5	29.978	39.0	32.2	25.4							.02	W	1/2	W	1/2		2	ci	3	st	—										30																
31	29.760	41.2	29.732	43.4	41.2	26.3							.03	S.W.	1/2	S.W.	1/2		10	st	10	st	—										31																
Sums.	17 1/2	97 1/2	1210 1/2	97 1/2	1210 1/2	97 1/2							15	1 1/2	26	27		201	193	38 1/2																													
Means.	29.571	47.8	29.680	47.8	47.8	35.5													6.5	6.2																													
† Total Corrections for Instrumental Errors.	29.735	46.9	29.705	46.6	44.3	35.5																																											
† Corrections for Diurnal Range.	29.741	46.2	29.711	45.9																																													
“Corrected Means.”	29.741	46.2	29.711	45.9																																													
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† = 29.695
for Temp. (Col. 2), = 29.741 — .046 = 29.695
Corrected Mean” of Barometer at 9 P.M., minus the Correction† = 29.665
for Temp. (Col. 4), = 29.711 — .046 = 29.665
Mean at Station, corrected, and at 32° = 29.680
Correction for height, 66 feet above Mean Sea-level, = .074
Mean, reduced to 32°, and Sea-level, = 29.754
Highest Reading, corrected for Index error, on the 15th, = 30.292
Lowest Do. Do., on the 25th, = 29.010
Difference, or Monthly Range, = 1.282

S.-R. THERMOMETER, (in shade, etc.), Highest in Month, (corrected for Index Errors), on the 4th, = 52.4
Lowest in Month, corrected for Index errors, on the 30th, = 25.4
Difference, or Monthly Range, = 27.0
“Corrected Mean” of all the Highest, (Col. 5), = 44.3
“Corrected Mean” of all the Lowest, (Col. 6), = 35.5
Difference, or Mean Daily Range, = 8.8
** Calculated Mean Temperature of Month, = 39.9

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), = —

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

† Computed Temperature of Dew-Point, = —

† Do. Elastic Force of Vapour, = —

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

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

RAIN fell on 15 Days; Amount in Inches, = 1.72

WIND.									SUMMARY.			
Direction.	N	NE	E	SE	S	SW	W	NW	Calm or Variable.	Mean Force.	Mean Velocity in miles per day.	
A.M.	0	0	0	3	4	13	9	2	0	0.84		
P.M.	0	0	0	2	2	15	10	1	1	0.87		
Mean.	0	0	0	3	3	14	9	2	0	0.86	10.73	

Observations made and
Return verified by

James Dale, Teacher in
Robert Gordon's College

(Signed)

J.H.
J.B.

