

SCOTTISH METEOROLOGICAL SOCIETY.

Observations taken at Baron Cuthbert County of But, in Lat. 55° 49' 50" Long 5° 4' 5", Distance from Sea 10 miles.

Height of Cistern of the Barometer above Mean Sea-Level 116 feet, above Ground 13 feet.

During the MONTH of January 1891

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.	Days of Month.		
		9 h. A.M.		9 h. P.M.		Protected in Shade, 4 feet above Ground.		Exposed Black Bulbs. Sun-bulb, Grass.		9 h. A.M.		9 h. P.M.			9 h. A.M.		9 h. P.M.		9 A.M.		P.M.		9 h. A.M.								
		Barometer.	Attached Thermometer.	Barometer.	Attached Thermometer.	Max.	Min.	Max.	Min.	Dry bulb.	Wet bulb.	Dry bulb.	Wet bulb.		No. of hours in which it fell.	Direction.	Force.	Direction.	Force.	Readings of the H. Cup Anemometer.	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.
		* No.	inches.	No.	inches.	No.	No.	No.	No.	No.	No.	No.	No.		No.	No.	No.	No.	No.	No.	No.	No.	No.	No.	No.					No.	No.
		inches.	°	inches.	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°				
	1	30.050	39	30.090	40	40.3	36.5			38	35.6	39	38	0.42	NE	1.5	NE	1			10		10					Drill by fire	1		
	2	30.080	42	30.140	42	41	38.6			39.5	39	39.5	39	0.05	SW	—	calm	—			10		10					" heavy rain & damp	2		
	3	30.050	42	29.930	43	43.8	39			41.5	41	38.5	38	1.96	SW	—	calm	—			10		10					"	3		
	4	30.030	40	30.200	38	40.3	34.5			32.5	31.8	31.5	28	—	calm	—	NR	1.5			6		—					"	4		
	5	30.000	35	30.420	36	41.3	32.3			30.5	28.5	30.5	29	—	NW	1.5	calm	—			—		—					"	5		
	6	30.450	33	30.380	35	34.8	26			26.5	25.5	31.5	29.5	—	calm	—	calm	—			5		10					"	6		
AB	7	30.200	35	29.930	35	40.3	27			34.2	32.5	29	27	0.02	NW	1.5	SW	1.5			7		—					"	7		
	8	30.610	35	29.630	36	39.5	28.5			36	35	33.5	33	1.50	S	1	calm	—			10		10					"	8		
	9	29.940	37	30.164	36	40.5	29.8			34	33.3	29.8	28.5	—	calm	—	calm	—			10		3					"	9		
	10	30.264	36	30.280	38	43	29.5			35	34.3	40	38	0.05	SW	1.5	WSW	1			6		10					"	10		
	11	30.300	41	30.366	44	45.8	39.5			44.5	42.5	45	44	0.50	SW	1.5	N	1			10		10					"	11		
	12	30.540	47	30.630	46	47	43.5			45	44.5	44	43.5	0.25	SW	1.5	WSW	5			10		10					"	12		
	13	30.594	46	30.560	48	48.8	41			44.2	43	42.5	39.5	—	SW	1	NW	1.5			6		—					"	13		
	14	30.660	43	30.746	39	42.5	32			36.2	33	31.3	29.5	—	NW	1	N	1.5			—		1					"	14		
	15	30.550	38	30.250	41	44.8	30.5			37.5	36.3	37.5	36	0.35	N	1.5	N	1.5			10		—					"	15		
	16	30.200	41	30.230	41	42.5	35.5			37.8	36.5	36	34.5	—	calm	—	calm	—			8		10					"	16		
	17	30.290	39	30.360	37	38.8	30.5			32	30.8	32.8	30.8	—	calm	—	SE	1.5			8		9					"	17		
	18	30.284	37	30.130	38	36	32.2			34.8	31.5	32.8	31	1.10	SW	5	NW	1.5			10		8					"	18		
	19	30.020	37	29.850	43	42	32.5			36	35.5	41.5	40	0.92	SW	5	SW	1.5			9		10					"	19		
	20	29.270	43	29.130	40	46	31.5			46.5	43	31.5	31.5	2.76	SW	2.3	NW	1			10		5					"	20		
	21	29.200	37	29.130	39	37	28			30.5	29.5	34	33.2	0.46	—	—	SW	1			3		10					"	21		
	22	29.210	37	29.450	38	38	26.8			32	31	29	28	1.80	NW	1.5	calm	—			2		8					"	22		
	23	29.060	41	29.150	43	48.3	29.3			46.8	45	43	41	3.48	SSW	1.5	WSW	1.5			9		9					"	23		
	24	29.154	43	29.260	40	44.5	32.5			38	37	36	35	2.90	N	1.5	NW	1			2		9					"	24		
	25	29.680	40	29.650	43	46.5	35.3			38.8	37	44.8	42.2	0.65	N	1.5	SW	1.5			2		10					"	25		
	26	29.570	44	29.392	46	48.2	42.8			43.5	41.5	45.3	44.5	0.30	SW	1.5	SW	2			9		10					"	26		
	27	29.504	47	29.644	45	47	40.5			41.5	39.6	43	41.5	1.58	WSW	1.5	SE	1			8		8					"	27		
	28	29.460	45	29.630	46	51.2	41.3			46	45.3	46	43	0.25	SSW	1.5	SW	1			9		8					"	28		
	29	29.470	44	29.510	46	47.6	40.5			43.3	42.3	42	40.5	1.95	SE	2	SW	1.5			10		3					"	29		
	30	29.684	46	29.734	45	49.5	39.5			40.5	39.2	42	40.8	0.40	WSW	1.5	calm	—			5		5					"	30		
	31	30.130	43	29.690	45	44.5	38.3			40	39	39.5	38	2.25	SSW	1.5	SW	1			10		—					"	31		
Sums.		10 13 2	14	13 14 2	15	15 16	15 14			14 10	14 9	14 9	15 7	10 7							22 5		206								
Means.		227.784	1253	227.656	1270	124.3	10462			2521	114.1	113.95	112.3	111.70	3789	253	182														
Total Corrections for Instrumental Errors.		29.928	40.4	29.924	41.0	43.3	33.7			38.1	36.7	37.5	36.0		0.7	0.6															
Corrected Means.																															
No. of Column.		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30

BAROMETER, "corrected Mean" at 9 A.M., minus the Correction $\frac{1}{100}$ for Temp. (Col. 2), = 29.896
 "Corrected Mean" of Barometer at 9 P.M., minus the Correction $\frac{1}{100}$ for Temp. (Col. 4), = 29.890
 Mean at Station, corrected, and at 32°, = 29.893
 Correction for height, feet above Mean Sea-level, = 127
 Mean, reduced to 32°, and Sea-level, = 30.020
 Highest Reading, corrected for Index error, on the th., = 30.746
 Lowest Do. Do., on the th., = 29.060
 Difference, or Monthly Range, = 1.686

S.R. THERMOMETER, (in shade, etc.), Highest in Month, (corrected for Index Errors), on the 28th., = 51.2
 Lowest in Month, corrected for Index errors, on the 6th., = 25.0
 Difference, or Monthly Range, = 26.2
 "Corrected Mean" of all the Highest, (Col. 5), = 43.3
 "Corrected Mean" of all the Lowest, (Col. 6), = 33.7
 Difference, or Mean Daily Range, = 9.6
 ** Calculated Mean Temperature of Month, = 38.5
 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), = 37.8
 Mean (corrected) A.M. and P.M. Reading of Wet Bulb, (Cols. 10 and 12), = 36.4
 Computed Temperature of Dew-Point, = 34.5
 Do. Elastic Force of Vapour, = .200
 Do. Weight of Vapour in a Cubic Foot of Air, =
 Relative Humidity (Saturation = 100), = 88
 RAIN fell on 23 Days; Amount in Inches, = 3.19

WIND.		SUMMARY.									
Direction.		N	NE	E	SE	S	SW	W	NW	Calm or Variable.	Mean Force.
A.M.		2	1	1	0	8	6	5	4	3	0.7
P.M.		2	2	0	1	1	8	4	4	9	0.6
Mean.		2	2	0	1	4	7	5	4	6	0.65 = 0.42

* 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 Arithmetic Mean of Cols. 5 and 6 will be entered as the "Calculated Mean Temperature."
 ** Any observations not taken under the Conditions specified in the Directions on the other side, or noted at the Top of each column, must be marked as such by the observer, in each Schedule. See over.

Observations made and Return verified by James Kay

(Signed) James Kay

INSTRUCTIONS

FOR TAKING METEOROLOGICAL OBSERVATIONS,

WITH REMARKS ON THE USE OF INSTRUMENTS.

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

Observation. as specified in the following remarks, or the accuracy of the columns of the Schedule. It is hoped that the utmost punctuality in the time of reading the instruments will be observed. Observers, in some 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 pressure is increased or diminished, thus raising or depressing the surface till it just meets the ivory point, which is originally constructed by Mr. Adie of London, and is usually called the Bar of Trade. Barometer, has the great advantage of requiring no adjustment of the cistern. Its scale-inches are not two inches, but so much shorter as to compensate the error that would otherwise arise from the fluctuations of the surface of mercury in the cistern. This is an excellent Barometer for ordinary Observers, inasmuch as it is entirely eliminates the error of observation likely to arise in not a few cases in setting the instrument to zero point of the fixed scale when the light is not good. To slow 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.

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

It is absolutely necessary that the Barometer which is to be used shall have been compared with a Standard Barometer. The Barometer should be suspended in a good 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 best way of securing that the wind instrument, including the glass, fittings, the contained mercury, and the attached Thermometer, shall be when read, at one uniform stable state, is evident that the best position is that in which the instrument is placed, and the glass is not to be taken out of its case. An observation, the Attached Thermometer is first noted; the tube must then be gently tapped, and the cistern-adjustment carefully made. The eye by raising and lowering it, must be brought into the plane of the back and front of the index—usually the lower edge of the vernier, which must be carefully adjusted so as to form exactly a tangent to the convex surface of the mercury in the tube. Observations must be taken quickly, so as to prevent heat from the observer's hands and person from affecting the mercury. The use of a lens will facilitate an accurate adjustment 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 1.000 inch, 0.500 inch, and 0.050 inch; that is to say, instead of 29.365 inches, either of the following is sometimes set down—viz. as 30.365 inches, 29.365 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 ivory 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 mercury not quite to the top of the tube, but to within a quarter of an inch of it, and take down the instrument; it should then be carried with the cistern uppermost. Before suspending the Barometer for use, it must be ascertained whether the space above the mercury in the tube is a complete vacuum; this is the case if, on inclining the instrument, a sharp tap is produced when the mercury strikes the top of the tube. If a dull tap is heard, there is air in the tube, which must be got rid of.

As Barometers are liable to be deranged 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 in its air may be expelled. First close up the cistern by screwing up 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, gently tap the top of it on a yielding substance, such as the heel of a shoe, so as to induce the air to ascend through the column of 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 unfastening 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 protection to the weather, as shown in the past by repeated and annoying breakages of Thermometers, either Negretti and Zambias, or Phillips's Maximum Thermometers, either Negretti and Zambias, or Phillips's, whether they will act at the highest temperatures they may be required to register. By the laws of the Society, Members and Observers have a right to have their instruments compared by the Secretary, and to advise with him regarding the purchase of instruments. Very great care should be bestowed on the Observations of the Wind, the accuracy of which, both as regards Direction and Force, is so essential towards the science of discussion of many of the more important problems of the science. 1. As regards wind, it should be elevated at least 12 feet above surrounding objects. When it settles necessarily, the wind 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., which is made on the changes in the direction of the wind; and during storms, as a system of observations to every four of Greenwich time. Such a system is likely to give highly valuable and useful results, especially in connection with the system of high-placed Stations over the limited district round Edinburgh, called Storm Stations, in the course of being established by the Society for the systematic investigation of the relation of the force of the wind to BAROMETRIC GRADIENTS and other points connected with storms.

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 Anemometers recently brought under the notice of the Society by Mr. T. Stevenson, the Honorary Secretary, and Mr. R. Ballingall, the Society's Observer at Ellaburgh, are recommended as likely to secure uniformity in making observations on the Force of the Wind. Many causes conspire to produce anomalies in Rain Returns, arising partly from the difficulty of obtaining a perfectly unobstructed situation for observation, and partly from the defective nature of the instruments used. The Rain Gauge should not be placed on a slope or terrace, but on a level piece of ground, in as open a situation as the Observer can secure for it. As it is often difficult to obtain a position as free and unobstructed by surrounding objects as is desirable, care should be taken to place it at some distance from shrubs, trees, buildings, or other obstructions, at least as many feet from their base as they are in height. The more important directions, towards which it is most desirable to have a free exposure, are, in the order of their importance, S.W., N.E., S.E., 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 its stem projecting above the rim of the gauge, frequently interferes with the proper measurement of the Rain. When a measuring-rod is used, care should be taken to take daily a quiet pen-and-ink reading. Rain-gauges should be taken daily at 9 A.M. the reading entered in the Remarks of the previous day, if the Gauge is read once a month, the reading is to be made on the first of the month, and the amount entered for the previous month. 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 letter S affixed to the depth of water received in Gauge. The depth of the snow must be measured in some open place where no drift is observed, and registered in addition to, and as a check upon, the indications of the Rain Gauge. For wind, rain, and snow, as indeed in every column, the Observer cannot be too careful to register 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 obscuration of the sky overhead (i.e. within 20° or 30° of the zenith). The strata of Clouds that appear near the horizon are viewed obliquely; and thus, being unable to judge of their amount, we ought not to take them into account in the Clouds column, though their appearance and changes may be noted among the Remarks. The amount of Cloud is entered from a scale of 0 to 10; thus, when the sky overhead is free from Clouds it is entered 0, when half-covered by Clouds, 5, wholly covered, 10, and so on.

Observations of the Clouds are made at 9 A.M. and at sunset, as illustrating the condition and currents of the upper and lower regions of the atmosphere. The entries in the schedule are to be made in the following manner.—Thus, in the column Velocity and Direction, 9, S. W. will indicate that the upper strata of Clouds travel with extreme velocity from S.W., and those in the lower regions from W., with one-third the speed of the former. Again, in the second Cloud column, an entry of 2, 4, 5, will indicate that the higher regions are covered to the amount of 4 tenths with stratus Clouds; and that the sky is further observed to the extent of 2 tenths by low 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 Sunshine 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 fitted with sloping glass funnels, to prevent rain-water being conveyed to the bulbs by the stems or wooden frames.

A knowledge of the Temperature of the Sea is not only in itself, but in its relations to that of our island, a most important branch of Meteorology. The Council therefore recommend that the Temperature of the Sea be taken by a property constructed apparatus, from boats, or, if this be impracticable, from the ends of piers and rocks round the coast, where it is not influenced by that of river water, and as little influenced as possible by the heat of the sun or cooled by the sun or cooled by

correct numbering of the scale of every instrument; the rejection of Thermometers the frameworks of which are likely to stand exposure to the weather, as shown in the past by repeated and annoying breakages of Thermometers, either Negretti and Zambias, or Phillips's Maximum Thermometers, either Negretti and Zambias, or Phillips's, whether they will act at the highest temperatures they may be required to register. By the laws of the Society, Members and Observers have a right to have their instruments compared by the Secretary, and to advise with him regarding the purchase of instruments. Very great care should be bestowed on the Observations of the Wind, the accuracy of which, both as regards Direction and Force, is so essential towards the science of discussion of many of the more important problems of the science. 1. As regards wind, it should be elevated at least 12 feet above surrounding objects. When it settles necessarily, the wind 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., which is made on the changes in the direction of the wind; and during storms, as a system of observations to every four of Greenwich time. Such a system is likely to give highly valuable and useful results, especially in connection with the system of high-placed Stations over the limited district round Edinburgh, called Storm Stations, in the course of being established by the Society for the systematic investigation of the relation of the force of the wind to BAROMETRIC GRADIENTS and other points connected with storms.

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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 obscuration of the sky overhead (i.e. within 20° or 30° of the zenith). The strata of Clouds that appear near the horizon are viewed obliquely; and thus, being unable to judge of their amount, we ought not to take them into account in the Clouds column, though their appearance and changes may be noted among the Remarks. The amount of Cloud is entered from a scale of 0 to 10; thus, when the sky overhead is free from Clouds it is entered 0, when half-covered by Clouds, 5, wholly covered, 10, and so on.

Observations of the Clouds are made at 9 A.M. and at sunset, as illustrating the condition and currents of the upper and lower regions of the atmosphere. The entries in the schedule are to be made in the following manner.—Thus, in the column Velocity and Direction, 9, S. W. will indicate that the upper strata of Clouds travel with extreme velocity from S.W., and those in the lower regions from W., with one-third the speed of the former. Again, in the second Cloud column, an entry of 2, 4, 5, will indicate that the higher regions are covered to the amount of 4 tenths with stratus Clouds; and that the sky is further observed to the extent of 2 tenths by low 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 Sunshine 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 fitted with sloping glass funnels, to prevent rain-water being conveyed to the bulbs by the stems or wooden frames.

A knowledge of the Temperature of the Sea is not only in itself, but in its relations to that of our island, a most important branch of Meteorology. The Council therefore recommend that the Temperature of the Sea be taken by a property constructed apparatus, from boats, or, if this be impracticable, from the ends of piers and rocks round the coast, where it is not influenced by that of river water, and as little influenced as possible by the heat of the sun or cooled by the sun or cooled by

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 along the coast, by the method proposed by Mr. T. Stevenson, and already commenced at Peterhead and Liverpool. The Temperature of the water at the bottom of Wells ought, when practicable, to be taken, both the depth of the Temperature Well and of the water being noted. Mention what Test-Papers are used, Schönbien's or Mofitt'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 3 ¹/₂, 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 Electrometer is, in truth, necessary to every complete meteorological observatory.

The Remarks column is unavoidably too narrow. Some of the most valuable Observations that may be given per hour assigned, the use of contractions ought, therefore, to be taken every advantage of, and a list of such as are in general use is given at the foot of the column. Besides special and extraordinary Observations, great prominence ought to be given in this column to Precipitation, differences in character, colour, velocity, and direction between the Lower and Upper Strata of clouds, the Colour of the Barometer, 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 hinted 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 unoccupied, or ruled off for the purpose, from the column of 'Remarks.' Observations in connection with the Periodic Return of the Observations in Seasons, possess not only great scientific value, but observation with are of considerable importance in connection with the Fenetic Re-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 replacing old ones, to communicate with the Meteorological Secretary, in order that every instrument may be examined and improved before being used; and they consider it necessary that he should have full power to reject any instrument which, on being presented for comparison, does not afford him satisfaction.

(By Order)

Edinburgh, December 1883.

OBSERVATIONS IN CONNECTION WITH THE PERIODICAL RETURN OF THE SEASONS.

FOREST TREES.	PLANTS.	FRUITS.	MIGRATORY BIRDS.	First Arrival.	First Departure.
Alder,	Barley,	Apple,	Chukoo,		
Ash,	Beet,	Cherry,	Curlew,		
Beech,	Corn,	Gooseberry,	Lapwing,		
Birch,	Corn,	Plum,	Starling,		
Elm,	Peas,	Peach,	Sand-Martin,		
Larch,	Peas,	Plover,	Swan,		
Lime,	Potatoes,	Swan,	Rail or Corn Crake,		
Oak,	Turnips,				
Sycamore or Plane,					

SHRUBS, ETC.	First in Blossom.	First in Fruit.	First in generally.	First in generally.	First in generally.
Barberry,					
Bourne or Elder,					
Broom,					
Hazel,					
Hawthorn,					
Holly,					
Laburnum,					
Lilac,					
Mountain Ash or Rowan,					
Red Flowering Currant,					
Rhododendron Ponticum,					
Whin,					

Have the goodness also to state any information you may be able to collect relative to the Crops of Grain, Hay, Potatoes, Turnips, Fruits, etc., in perfection; whether any have suffered from blight, disease, etc. Whether zootic disease prevails among cattle; and the Agricultural condition of the district generally.

Write over again according to the form sent by you.

To the SECRETARY

Scottish Meteorological Society,

122 George Street,

EDINBURGH.

BOOK POST.



SCOTTISH METEOROLOGICAL SOCIETY.

Observations taken at *Baron Cattan* County of *But*in Lat. $55^{\circ}49'50''$ Long. $5^{\circ}41'5''$, Distance from Sea *10* miles.Height of Cistern of the Barometer above Mean Sea-Level *116* feet, above Ground *3* feet.During the MONTH of *February* 188*9*

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 Bulb.		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.	9 h. A.M.	P.M.	SUNSHINE. Hours.	9 h. A.M.							Temperature of Well at 4 ft. below surface, No.	Temperature of Air at 4 ft. above ground, and Dewy.	9 A.M.	P.M.			
		Barometer.	Attached Thermometer.	Barometer.	Attached Thermometer.	Max. No.	Min. No.	Max. No.	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.	No.									No. 3 inches.	No. 12 inches.	No. 22 inches.
		inches.	°	inches.	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°				
	1	30.064	41	30.234	42	48	33.3			37	36.3	41.8	39.8	050	SW	S			18	10													1				
	2	30.220	46	30.210	49	51.5	41.8			49	47	49.5	47.8	008	SW	SW			10	10													2				
	3	30.180	49	30.410	48	51.2	41.5			49	47.5	42	41.5	080	SW	SW			10	2													3				
	4	30.564	46	30.550	46	47	33.6			42.5	42.2	38	37.8	005	calm	calm			10	9													4				
	5	30.530	47	30.524	47	48	38			44	43	46	44.5		NW	SW			10	10													5				
	6	30.470	48	30.432	49	49.5	44.2			46	46	45	44.2		WNW	W			10	10													6				
	7	30.340	46	30.220	46	46.5	43			43.5	41.3	44.8	43	020	SSW	W			10	10													7				
	8	30.380	44	30.400	43	50.5	33.2			34.6	33.3	33	32		NW	calm			2														8				
	9	30.290	41	30.160	40	45.3	29.7			33	30.2	39	36		calm	SW				8													9				
	10	30.110	43	29.960	45	46	37.5			41	39	44.5	41	098	SW	WSW			10	10													10				
	11	29.832	46	29.832	48	51	39.8			46.5	45.5	39	36.5	118	WSW	NW			10														11				
	12	30.192	41	30.442	41	46.5	30.3			37	36	33.5	32.5	030	SW	NW			8	9													12				
	13	30.440	40	30.400	41	41.5	33.2			35.8	33.3	40	40	088	NR	calm			10	10													13				
	14	30.400	45	30.430	47	49.2	40.2			45	44.5	44	42.2		W	SW			10	10													14				
	15	30.410	47	30.360	45	53	38.8			41.5	40.8	42	40.8		calm	SW				2													15				
	16	30.414	44	30.500	45	47.5	37.8			42	41	42	41.2		calm	calm			9	10													16				
	17	30.514	44	30.502	47	46.3	37			40.3	40	43.8	41		calm	SW			10	10													17				
	18	30.520	45	30.520	46	49.5	37.3			43	41.3	36.5	36		SSW	NW			10														18				
	19	30.450	44	30.320	44	50.3	34.6			36.3	36	35	34		calm	calm			10	10													19				
	20	30.270	43	30.170	44	54.2	33.2			35	34	43	39		calm	NR																	20				
	21	30.190	42	30.156	44	44.5	36			37.8	36.5	37	35.6	052	SSR	SW			10	10													21				
	22	30.090	41	30.180	45	50	37.3			40.5	40	45.2	42	015	RSE	SW			10	8													22				
	23	30.240	44	30.250	46	51.8	44			46.3	40.8	48.3	43		SSW	RSE			8	9													23				
	24	30.304	46	30.220	47	55.5	39.2			40.8	39.5	44	41.2		NR	calm			2	6													24				
	25	30.070	46	29.940	40	51	38			40	38	41.5	39.2		SE	SSR																	25				
	26	29.848	44	29.864	43	51.5	36.5			39.6	36.5	36.5	34		NR	calm																		26			
	27	30.044	42	30.150	45	52	30			33	32	34.5	33		calm	calm			10														27				
	28	29.984	40	29.846	47	47.6	32.5			39.8	38.8	46.5	46	215	SSR	SW			9	10													28				
	29																																		29		
	30																																		30		
	31																																		31		
Sums.		10 14 4	11	5 12 10 3	14	12 8	14 8			12 7	12 7	13 6	11 6		h u																						
Means.		54.7	4.10	12.35	54.7	0.34	12.6	6.15	6.7	10.4	34				113.9	110.3	115.5	110.4	8	0.7	7.9																
+ Total Corrections for Instrumental Errors.																																					
+ Corrections for Diurnal Range.																																					
"Corrected Means."																																					
No. of Column.		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30						

BAROMETER, "corrected Mean" at 9 A.M., minus the Correction $\frac{1}{1000}$ for Temp. (Col. 2), = *30.223*

"Corrected Mean" of Barometer at 9 P.M., minus the Correction $\frac{1}{1000}$ for Temp. (Col. 4), = *30.205*

Mean at Station, corrected, and at 32°, = *30.214*

Correction for height, *116* feet above Mean Sea-level, = *.127*

Mean, reduced to 32°, and Sea-level, = *30.341*

Highest Reading, corrected for Index error, on the *18* th., = *30.564*

Lowest Do. Do., on the *28* th., = *29.832*

Difference, or Monthly Range, = *0.732*

S.-R. THERMOMETER, (in shade, etc.), Highest in Month, (corrected for Index Errors), on the *24* th., = *56.5*

Lowest in Month, corrected for Index errors, on the *27* th., = *29.2*

Difference, or Monthly Range, = *26.3*

"Corrected Mean" of all the Highest, (Col. 5), = *49.2*

"Corrected Mean" of all the Lowest, (Col. 6), = *36.9*

Difference, or Mean Daily Range, = *12.3*

** Calculated Mean Temperature of Month, = *43.0*

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), = *41.0*

Mean (corrected) A.M. and P.M. Reading of Wet Bulb, (Cols. 10 and 12), = *39.3*

†† Computed Temperature of Dew-Point, = *37.2*

†† Do. Elastic Force of Vapour, = *.221*

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

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

RAIN fell on *12* Days; Amount in Inches, = *0.78*

WIND.		SUMMARY.									
Direction.		N	NE	E	SE	S	SW	W	NW	Calm or Variable.	Mean Force.
A.M.		0	3	1	1	5	5	3	2	8	
P.M.		0	1	1	0	3	9	3	3	8	
Mean.		0	2	1	0	4	4	3	3	8	

Observations made and Return verified by

James Kay

(Signed)

James Kay

7A.

INSTRUCTIONS

FOR TAKING METEOROLOGICAL OBSERVATIONS,

WITH REMARKS ON THE USE OF INSTRUMENTS.

One of the chief objects that the SCOTTISH METEOROLOGICAL SOCIETY proposed to itself when the Society was established in 1855, was to secure perfect uniformity in the system of observation pursued at all its Stations. Uniformity in the system of observation is particularly necessary to justify the publication of the Quarterly Results from different observations, it being found that differences between the Returns from two Stations, so very considerable as to render them quite incomparable, unless the cause of dissimilarity in the position or situation of the Stations, or of the instruments, or of the observers, be ascertained. It is therefore hoped, that those who are engaged in the study of the subject, will be able to direct the attention to the following Directions, secure for their Monthly Returns an accuracy and value commensurate with the labour and pains involved in making them; and, for the Tables published by the Society, an entire comparableness among the several Returns, without which the Society's Reports must inevitably fail in achieving one of the main objects of Meteorological Observation.

The Council recommend that Observations be made precisely at 9 A.M. and 9 P.M. (Greenwich or Railway Time only), of the following remarks, or at the top of the column of the Schedule. It is hoped that the utmost punctuality in the time of reading the instruments will be observed. Observers, in some few cases, may find this impossible; in such instances, they are specially requested to mark opposite every reading the time at which it was taken, if not at 9 A.M. or 9 P.M. 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 Fournier'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. Ait of London, and usually called the Board of Trade Barometer, has the same convenience of requiring no adjustment of the cistern. Its scale, however, is not true, but so much shorter as to compensate the error that would otherwise arise from the fluctuating surface of the mercury in the cistern. This is an excellent Barometer for ordinary Observers, inasmuch as it is so constructed that the observation likely to arise from the fluctuating surface of the mercury is got rid of, and the error in setting the instrument is very small. In some cases, in setting the instrument, it is found that one of the fixed scales when the light is not good, or when the observer is not very careful, may be mistaken for the other, with which these Barometers are made, it is not slow to detect. During a whole year, with the Society's Standard Barometer, particular care being given to make the comparison when atmospheric pressure was rising or falling very rapidly, with the result that none of the readings differed from those of the Standard more than 0.003 inch.

A modification of Fournier's Barometer is used at a number of the Society's Stations, by which the coincidence of the zero point with the surface of the mercury is indicated by a little ivory float, whose stem passes freely through the lid and case of the cistern. When the index-line on this little piston-rod is brought, by the adjusting screw, to form one straight line with those on its ivory frame, the error of the mercury is then at the exact height from which 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 tube, and the lower edge of the vernier, which must be carefully adjusted, 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 the heat from the observer's hand, or from the air, from affecting the mercury. The use of a lens will facilitate accurate adjustment, and the reading of the Barometer will be more certain. The mercury in the tube is to be observed, consisting in setting the edge of the vernier to a 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 1.000 inch, 0.500 inch, and 0.050 inch; that is to say, instead of 29.365 inches, either of the following is sometimes set down—viz. as 30.365 inches, 28.365 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 ivory 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 mercury not quite to the top of the tube, but to within a quarter of an inch of it, and take down the instrument; it should then be carried with the cistern uppermost. Before suspending the Barometer for use, it must be ascertained whether the space above the mercury in the tube is a complete vacuum; this is the case if, on inclining the instrument, a sharp tap is produced when there is air in the tube, which must be got rid of.

As Barometers are liable to be deranged 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 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 the cistern with the palm of the hand, so as to induce the air to ascend through the column to the hand, 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 found that the clear middle sound of the bellows, when gently struck against the top of the tube, will allow the air to be expelled. On hanging up the Barometer, care must be taken to see that the ivory peg is tight, and that the mercury will flow out, and the

The Council of the Society recommend that the Self-Registering Thermometer, and the Dry and Wet Bulb Hygrometer, be kept in Stevenson's Louver-boarded Box for protection to the weather, as shown in the past by repeated and annoying breakages of Thermometers of similar construction; and as regards Maximum Thermometers, either Negretti and Zambra's, or Phillips's, whether they will act at the highest temperatures they may be required to register. By the laws of the Society, Members and Observers have a right to have their instruments compared by the Secretary, and to advise with him regarding the purchase of instruments. Very great care should be bestowed on the Observations of the wind. Wind, the accuracy of which, both as regards Direction and Force, is of the most important nature, should be discussed 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 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 thick-planned Stations over a limited district round Edinburgh called STORM STATIONS, in the course of being established by the Society for the systematic investigation of the relation of the force of the wind to the direction of the storm, and to the position connected with storms. The Council also recommend that a self-registering anemometer, 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 brought under the notice of the Society by Mr. T. Stevenson, the Honorary Secretary, and Mr. R. Ballingall, the Society's Observer at Edinburgh, are recommended as likely to secure uniformity in making observations on the Force of the Wind.

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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 amount of Hourly Rain, 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, it is important to record the amount and constancy of the temperature of the soil—this is done in the column of the Self-Registering Thermometer. Observations in this interesting department be made at 9 A.M., by Thermometers permanently fixed in the soil, their bulbs being sunk to depths of 3, 12, and 22 inches, and the stems above ground protected from the sun's rays, and fitted with sloping tin collars, to prevent rain-water being conveyed to the bulbs by the stems or wooden frames.

A knowledge of the temperature of the Sea is not only in itself, but in its relations to that of our island, a most important branch of Meteorology. The Council therefore recommend that the temperature of the Sea be carefully taken by a properly constructed thermometer, from boats, or, if this be impracticable, from the ends of piers and rocks round the coast, where it is not influenced by the heat of river water, and as little influenced as possible by currents sweeping along the coast, and thus acquiring the temperature of the land, either greatly heated by the sun or cooled by nocturnal radiation. At or near the time of high

correct numbering of the scale of every instrument; the rejection of Thermometers the frameworks of which are not likely to stand exposure to the weather, as shown in the past by repeated and annoying breakages of Thermometers of similar construction; and as regards Maximum Thermometers, either Negretti and Zambra's, or Phillips's, whether they will act at the highest temperatures they may be required to register. By the laws of the Society, Members and Observers have a right to have their instruments compared by the Secretary, and to advise with him regarding the purchase of instruments. Very great care should be bestowed on the Observations of the wind. Wind, the accuracy of which, both as regards Direction and Force, is of the most important nature, should be discussed 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 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 thick-planned Stations over a limited district round Edinburgh called STORM STATIONS, in the course of being established by the Society for the systematic investigation of the relation of the force of the wind to the direction of the storm, and to the position connected with storms. The Council also recommend that a self-registering anemometer, 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 brought under the notice of the Society by Mr. T. Stevenson, the Honorary Secretary, and Mr. R. Ballingall, the Society's Observer at Edinburgh, are recommended as likely to secure uniformity in making observations on the Force of the Wind.

Many causes conspire to produce anomalies in Rain Returns, arising partly from the difficulty of obtaining a perfectly unobstructed situation for observation, and partly from the defective nature of the instruments used. The Rain Gauge should not be placed on a slope or terrace, but on a level piece of ground, in as open a situation as the Observer can secure for it. As it is often difficult to obtain a position as free and unobstructed by surrounding objects as is desirable, care should be taken to place it at some distance from shrubs, trees, buildings, or other obstructions, at least as many feet from their base as they are in height. The more important directions, towards which it is most desirable to have a free exposure, are, in the order of their importance, S.W., N.E., S.E., 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 rain columns, under the heading of "Falling Snow." When a Snow-fall occurs, it should be noted in the Returns, and the letter S affixed to the depth of water received in the Gauge. The depth of the snow must be measured in some open place where no drift is observed, and registered in addition to, and as a check upon, the indications of the Rain Gauge. For wind, rain, and snow, as entered in every column, the Observer cannot be too careful to register observations only; and nothing that partakes of the nature of deduction or inference.

Convenient abbreviations

SCOTTISH METEOROLOGICAL SOCIETY.

Observations taken at *Baron's Cottage, Rathfriland*, County of *Dub*in Lat. $55^{\circ}49'50''$ Long $5^{\circ}4'5''$, Distance from Sea $\frac{10}{16}$ miles.Height of Cistern of the Barometer above Mean Sea-Level $\frac{116}{3}$ feet, above Ground $\frac{3}{3}$ feet.During the MONTH of *March* 18*91*.

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 to Sun & Wind, 4 feet above Ground.		Dry No.		Wet No.			9 h. A.M.		9 h. P.M.		9 h. A.M.		9 h. P.M.		9 h. A.M.		9 h. P.M.																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																													
		Barometer.	Attached Thermometer.	Barometer.	Attached Thermometer.	Max.	Min.	Max.	Min.	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 H. Cup Anemometer.	9 h. A.M.	9 h. P.M.	Velocity (0-10), and Species.	Amount (0-10), and Species.	Velocity (0-10), and Species.					Amount (0-10), and Species.	SUNSHINE.	Hours.	No. 8 inches.	No. 12 inches.	No. 22 inches.	Temperature of Well at depth of feet.	Temperature of Air.	Temperature of Surface of Water.	Temperature of Dew.	Temperature of Frost.	Temperature of Soil.	Temperature of Snow.	Temperature of Ice.	Temperature of Rain.	Temperature of Hail.	Temperature of Thunder.	Temperature of Lightning.	Temperature of Storm.	Temperature of Hail.	Temperature of Rain.	Temperature of Snow.	Temperature of Ice.	Temperature of Soil.	Temperature of Water.	Temperature of Air.	Temperature of Surface of Water.	Temperature of Dew.	Temperature of Frost.	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Temperature of Rain.	Temperature of Snow.	Temperature of Ice.	Temperature of Soil.	Temperature of Water.	Temperature of Air.	Temperature of Surface of Water.	Temperature

BAROMETER, "corrected Mean" at 9 A.M., minus the Correction $\frac{1}{1}$ for Temp. (Col. 2), = $29.695 - .044 = 29.651$

"Corrected Mean" of Barometer at 9 P.M., minus the Correction $\frac{1}{1}$ for Temp. (Col. 4), = $29.689 - .034 = 29.655$

Mean at Station, corrected, and at 32', = 29.653

Correction for height, feet above Mean Sea-level, = $.127$

Mean, reduced to 32', and Sea-level, = 29.780

Highest Reading, corrected for Index error, on the 5th, = 30.110

Lowest Do. Do., on the 15th, = 28.984

Difference, or Monthly Range, = 1.126

S.-R. THERMOMETER, (in shade, etc.), Highest in Month, (corrected for Index Errors), on the 1st th, = 52.8

Lowest in Month, corrected for Index errors, on the 9th th, = 20.3

Difference, or Monthly Range, = 32.5

"Corrected Mean" of all the Highest, (Col. 5), = 46.2

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

Difference, or Mean Daily Range, = 14.2

** Calculated Mean Temperature of Month, = 39.1

S.-R. THERMOMETER, Black Bulb in Sun, Highest, (corrected for Index Errors), on the 1st th, = 52.8

"Corrected Mean," (Col. 7), of Black Bulb, Max. in Sun, = 46.2

Lowest at Night, Black Bulb (corrected for Index errors), on the 1st th, = 20.3

"Corrected Mean," (Col. 8), of Black Bulb, Min. on grass, = 32.0

Difference of above means or range ("exposed"), = 14.2

HYGROMETER, Mean (corrected) A.M. and P.M. Reading of Dry Bulb, (Cols. 9 and 11), = 37.2

Mean (corrected) A.M. and P.M. Reading of Wet Bulb, (Cols. 10 and 12), = 33.2

Computed Temperature of Dew-Point, = 32.4

Do. Elastic Force of Vapour, = $.184$

Do. Weight of Vapour in a Cubic Foot of Air, = $.83$

Relative Humidity (Saturation = 100), = 83

RAIN fell on 8 Days; Amount in Inches, = 3.901

WIND.		SUMMARY.									
Direction.		N	NE	E	SE	S	SW	W	NW	Calm or Variable.	Mean Force.
A.M.		2	4	3	1	0	3	9	4	2	1.0
P.M.		1	3	2	1	1	9	7	4	1.1	
Mean.		2	3	3	0	1	2	9	7	4	1.05 = 1.10

Observations made and
Return verified by*James Hay*

(Signed)

James Hay

7A.

SCOTTISH METEOROLOGICAL SOCIETY.

Observations taken at *Baronsburg*, County of *Butt*in Lat. $55^{\circ}49'50''$ Long. $5^{\circ}4'5''$, Distance from Sea 10 miles.Height of Cistern of the Barometer above Mean Sea-Level 116 feet, above Ground 3 feet.During the MONTH of *April*188*9*

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.		Days of Month.								
		9 h. A.M.		9 h. P.M.		Protected in Shade, 4 feet above Ground.		Exposed Black Bulbs.		Dry No. Wet No.		9 h. A.M.			9 h. P.M.		Readings of the H. Cup Anemometer.		9 A.M.		P.M.		9 h. A.M.		9 h. P.M.														
		Barometer.	Attached thermometer.	Barometer.	Attached thermometer.	Max. No.	Min. No.	Max. No.	Min. on Sun-ray Grass.	Dry bulb.	Wet bulb.	Dry bulb.	Wet bulb.		No. of hours in which it fell.	Amount in inches.	9 h. A.M.	9 h. P.M.	Direction.	Force.	Direction.	Force.	No.	Velocity (0-10), and Direction.	Amount (0-10), and Species.	Velocity (0-10), and Direction.						Amount (0-10), and Species.	No. 8 inches.	No. 12 inches.	No. 22 inches.	Temperature of W.E.I. at depth of feet, No.	Temperature at 1 fathom and Density.	9 A.M.	9 P.M.
		* No.	inches.	°	inches.	°	°	°	°	°	°	°	°		No.	No.	Direction.	Force.	Direction.	Force.	No.	No.	No.	No.	No.	No.						No.	No.	No.	No.	No.	No.	No.	No.
1	29.806	56	29.662	43	51	32.8			42.6	38.2	40	36.3	0.26	SE	5	SE	1																Between 9 and 9 p.m.	1					
2	29.600	39	29.652	40	41.5	35.5			35.5	34.3	36.3	34	0.68	E	2	E	2																Overcast p.m.	2					
3	29.600	39	29.530	40	44.5	34.5			36.5	33.2	38	35.2	1.90	ESE	2	E	2																Drill, gale all day	3					
4	29.480	41	29.480	42	44.2	37			40.5	39.5	41	39	0.15	SE	1.5	E	2																to clear - bitter cold	4					
5	29.480	42	29.574	42	42.5	37.8			40.2	38.8	38.2	36.5	2.90	ENE	2	E	2-3																Drill blowy & damp	5					
6	29.680	41	29.810	41	43.3	37.3			39	38	37.2	35.5		E	1.5	E	1.5																" "	6					
7	29.840	39	30.040	42	48.2	35.5					38.5	36		NW	5	calm																	" "	7					
8	30.110	48	30.120	44	52.5	32.5			42.6	37	37.5	35		E	5	calm																	to clear fine p.m.	8					
9	30.150	46	30.160	43	47.8	36.5			43	39	37.5	34.8		NE	5	calm																	" "	9					
10	30.150	53	30.070	47	52.5	36.8			50	45	44	41		SE	1	SE	1																	blowy	10				
11	30.400	44	30.164	47	56	37.5			41.5	38.5	43	40.5		NE	1	E	1																" "	11					
12	30.150	44	30.020	46	52.6	38.5			41.2	38.2	38.2	36		E	1	calm																	" "	12					
13	29.974	44	30.070	47	51.5	37			41	38.5	42.5	40.5	0.05	ESE	5	calm																	to clear	13					
14	30.090	44	30.082	46	56.2	38.5			42.5	39.5	38.5	37	0.58	NE	5	calm																		to clear	14				
15	30.650	50	30.050	47	52.5	33.5			48	46.3	41.5	40.3	1.10	SW	5	calm																		blowy choppy, shower	15				
16	29.934	52	30.050	48	52.6	39.5			47.2	44	39	37		NW	1.5	calm																		to clear blowy chilly fine	16				
17	30.160	52	30.110	49	56	31.5			48	41.5	40.2	37.5		N	5	NW	1.5																	" fine warm	17				
18	30.160	53	30.160	49	59.5	36.5			49.5	44.2	44.6	40.5		NE	5	NE	1.5																	" "	18				
19	30.240	55	30.250	52	57.6	38.8			49.5	43.5	44.5	40		ENE	5	E	1.5																	" "	19				
20	30.324	52	30.324	49	58.8	36.5			46.8	41	42	38.5		ENE	5	ENE	5																	" "	20				
21	30.340	49	30.250	46	50.6	36.5			43	38.5	39.3	36.5		NE	5	ENE	1.5																	" "	21				
22	30.220	47	30.210	46	54	37			43.2	38.2	40.5	38		NE	7	ENE	5																	to clear	22				
23	30.240	52	30.260	47	57.5	37.5			47	44.1	45	42.6		NE	1	E	5																	" heavy dry fine	23				
24	30.280	47	30.210	48	51.8	36.5			44	40.5	44.5	41.2		ENE	5	calm																		" fine chilly	24				
25	30.146	47	30.030	48	55.8	38.2			46.5	42	39.5	36.2		NW	5	WNW	1.5																	to clear	25				
26	29.924	49	29.794	49	54.5	32.8			45.2	41.2	43.5	41		WNW	5	calm																			blowy, clear p.m.	26			
27	29.646	50	29.500	52	54.2	40			49.5	44.5	45.5	41.5	0.25	SW	5	S	5																	to clear fine	27				
28	29.540	53	29.600	46	48.8	35			42.8	38.8	36.5	32		NW	1.5	WNW	1.5																	" heavy fine	28				
29	29.480	47	29.340	46	47	33.6			45.3	41.5	41.3	41	1.30	SSE	5	calm																		to clear choppy, shower	29				
30	29.400	48	29.370	52	59.5	41			49.4	46.8	48	46.5	7.25	SW	5	SSE	5																	Drill, chilly wet p.m.	30				
31																																			" fine, damp p.m.	31			
Sums.	12 13 2	14	5 13 2	15	14 13 17 13				14 9	12 9	15 9	13 9	11 4 2	16 4 2	26 5	19 3					19 8	19 1												NOTATION USED IN GENERAL REMARKS.					
Means.	29.945	47.4	29.931	46.1	51.8	36.3			44.3	40.4	40.7	38.1			0.9	0.6					6.6	6.4																	
* 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				TABLE FOR ESTIMATING FORCE OF WIND.					

BAROMETER, "corrected Mean" at 9 A.M., minus the Correction for Temp. (Col. 2), = 29.894 "Corrected Mean" of Barometer at 9 P.M., minus the Correction for Temp. (Col. 4), = 29.884 Mean at Station, corrected, and at 32°, = 29.889 Correction for height, 116 feet above Mean Sea-level, = $.127$ Mean, reduced to 32°, and Sea-level, = 30.016 Highest Reading, corrected for Index error, on the 27th, = 30.340 Lowest Do. Do., on the 29th, = 29.340 Difference, or Monthly Range, = 1.000 S.R. THERMOMETER, (in shade, etc.), Highest in Month, (corrected for Index Errors), on the 30th, = 59.5 Lowest in Month, corrected for Index errors, on the 7th, = 29.5 Difference, or Monthly Range, = 30.0 "Corrected Mean" of all the Highest, (Col. 5), = 57.8 "Corrected Mean" of all the Lowest, (Col. 6), = 36.3 Difference, or Mean Daily Range, = 15.5 ** Calculated Mean Temperature of Month, = 44.0 S.R. THERMOMETER, Black Bulb in Sun, Highest, (corrected for Index Errors), on the 14th, = 104.2 "Corrected Mean," (Col. 7), of Black Bulb, Max. in Sun, = 104.2 Lowest at Night, Black Bulb (corrected for Index errors), on the 14th, = 104.2 "Corrected Mean," (Col. 8), of Black Bulb, Min. on grass, = 104.2 Difference of above means or range ("exposed"), = 104.2

HYGROMETER, Mean (corrected) A.M. and P.M. Reading of Dry

Bulb, (Cols. 9 and 11), = 42.5 Mean (corrected) A.M. and P.M. Reading of Wet Bulb, (Cols. 10 and 12), = 39.1 Computed Temperature of Dew-Point, = 35.0 Do. Elastic Force of Vapour, = $.204$ Do. Weight of Vapour in a Cubic Foot of Air, = $.75$ Relative Humidity (Saturation - 100), = 75 RAIN fell on 11 Days; Amount in Inches, = 1.64

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

Observations made and
Return verified by*James May*

(Signed)

James May

7A.

SCOTTISH METEOROLOGICAL SOCIETY.

Observations taken at *Baron Cossage* County of *Rathbary*in Lat. $55^{\circ}49'52''$ Long. $5^{\circ}4'5''$, Distance from Sea $\frac{8}{10}$ miles.Height of Cistern of the Barometer above Mean Sea-Level $\frac{116}{3}$ feet, above Ground $\frac{3}{3}$ feet.During the MONTH of *May* 188*9*.

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.		Days of Month.								
		9 h. A.M.		9 h. P.M.		Protected in Shade, 4 feet above Ground.		Exposed Black Bulbs. Sun's Ray. Min. on Grass.		9 h. A.M.		9 h. P.M.			No. of hours in which it fell.	Amount in inches.	9 h. A.M.		9 h. P.M.		No. of hours in which it fell.	Amount in inches.	9 h. A.M.		9 h. P.M.							Temperature of Well at depth of feet, No.	Temperature at 1 fathom, and Density.	9 A.M.	9 P.M.				
		Barometer.	Attached Thermometer.	Barometer.	Attached Thermometer.	Max.	Min.	Max.	Min.	Dry bulb.	Wet bulb.	Dry bulb.	Wet bulb.				Direction.	Force.	Direction.	Force.			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.	
		* No.		No.		No.	No.	No.	No.	Dry bulb.	Wet bulb.	Dry bulb.	Wet bulb.				No.	No.	No.	No.			No.	No.	No.	No.										No.	No.	No.	No.
		inches.	°	inches.	°	°	°	°	°	°	°	°	°				°	°	°	°			°	°	°	°										°	°	°	°
1	29.130.52	29.176.52	52.43.5							47.547.3	42.842	280	SSW	5	W	1			10	8												Dull drizzly, damp	1						
2	29.450.46	29.624.49	52.37.2							39.38	40.537	095	NW	1	WNW	1			10	9												" wet air, clear pm	2						
3	29.600.46	29.672.50	52.23.8							41.240.241	39	025	SW	5	NW	5			10	-												" air clear	3						
4	29.860.49	30.010.52	59.33.5							46	42.842.541		W	5	W	5			5	-													" clear pm	4					
5	30.062.54	30.020.54	62.53.7							50.548.248	44.2	008	ENE	5	S	5				9													" clear pm	5					
6	30.010.51	29.950.54	59.34.4							50	46.348	45	100	calm	-	SSE	5			9	10												" clear pm	6					
7	29.864.58	29.620.56	61.54.6							54.251.350	48.3	336	S	1	calm	-			8	10													" clear pm	7					
8	29.510.49	29.786.50	51.54.2.5							44	43.246.244.5	115	SE	1	NNE	5			10	5													" clear pm	8					
9	29.940.50	30.040.54	64.843.5							51.548.849	44		NE	5	NE	5			9	-													" clear pm	9					
10	30.100.59	30.180.55	68.344.3							58	59	49	46		NE	1	NE	5		-	-												" clear pm	10					
11	30.210.59	30.232.58	63.845.5							59	49.556.349.2			NE	5	ENE	5		7	8													" cloudy	11					
12	30.266.63	30.250.60	71.249.3							66	54.652.549.5			ENE	5	SW	5		-	0													" clear pm	12					
13	30.150.57	30.130.55	55.646.3							50.549.547	43.3		WSW	5	NW	1			10	-													" clear pm	13					
14	29.980.53	29.770.52	52.541.5							48.345.545	40.8	365	SW	1	WSW	1.5			10	6													" clear pm	14					
15	29.510.49	29.710.48	54.637.3							53.541.238.234.2		025	NW	1.5	NW	1			10	2													" clear pm	15					
16	29.800.49	29.730.46	48.534							42.536.835	32.3		NW	1.5	NW	1			3	2														" clear pm	16				
17	29.540.49	29.414.47	47.632.5							42	36	37	34.8		NW	1.5	NW	1.5	5	5														" clear pm	17				
18	29.404.50	29.440.50	56.537.2							48.543.541.540		150	E	5	NW	5			8	8														" clear pm	18				
19	29.410.50	29.560.53	58.537.5							47.342.245	42.8	008	NW	5	W	5			8	2														" clear pm	19				
20	29.570.50	29.540.51	61.37.3							47.843.243.341			SE	5	NW	5			7	1														" clear pm	20				
21	29.580.51	29.584.50	56.40.5							47.343.543	41.5	040	NE	5	NNE	5			8	8														" clear pm	21				
22	29.630.55	29.620.53	61.635.5							52.247	45	41.5	006	SW	5	NW	5		1	1														" clear pm	22				
23	29.600.56	29.640.52	61.36.3							53	47.547	44.2	008	SE	5	NE	5		3	8														" clear pm	23				
24	29.800.53	29.864.52	61.41.5							51	46	45.843		NE	1.5	NE	5		8	8														" clear pm	24				
25	29.860.55	29.800.53	60.538							48	42	47	41.3		NE	5	NNE	5	6	5														" clear pm	25				
26	29.710.49	29.612.52	57.338.3							49.544.546	45	098	NE	5	NE	5			8	10														" clear pm	26				
27	29.500.53	29.490.53	57.343.5							50.847.347.546		045	NE	5	NE	5			9	10														" clear pm	27				
28	29.344.52	29.464.52	57.544.3							49.847	46.344.5	190	SE	5	NE	1			10	2														" clear pm	28				
29	29.440.50	29.580.53	58.344.5							49.248	45.543.8	040	SE	5	S	5			9	6													" clear pm	29					
30	29.620.54	29.760.55	61.242.8							53.549.348.345.2		005	SE	1	SSE	5			3	5														" clear pm	30				
31	29.810.56	29.800.56	64.541.6							56	51.352	49.4		TS	1.5	SE	2		8	9														" clear pm	31				
Sums.	1692	1613	1015							152	179	16	135			1939	23.0	19.5			22	165																	
Means.	22.260	1627	23.068	1627	1809	1756				154.26	142.05	14.22	132.3			1939	23.0	19.5			22	165																	
+ Total Corrections for Instrumental Errors.	29.750	52.5	29.744	52.5	52.4	40.5				49.9	45.8	45.6	42.7				074	0.63			6.6	5.3																	
+ 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.	ii.	denotes meteor.		
ci.	cirrus.	ms.	meteors.		
ci. cu.	cirro-cumulus.	n.	minors.		
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.		
hal.	halo.	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 $\frac{1}{1}$ for Temp. (Col. 2), = 29.654
"Corrected Mean" of Barometer at 9 P.M., minus the Correction $\frac{1}{1}$ for Temp. (Col. 4), = 29.630
Mean at Station, corrected, and at 32°, = 29.667
Correction for height, 116 feet above Mean Sea-level, = $.127$
Mean, reduced to 32°, and Sea-level, = 29.794
Highest Reading, corrected for Index error, on the 12 th., = 30.266
Lowest Do. Do. on the 12 th., = 29.130
Difference, or Monthly Range, = 1.136

S.R. THERMOMETER, (in shade, etc.), Highest in Month, (corrected for Index Errors), on the 12 th., = 71.2
Lowest in Month, corrected for Index errors, on the 17 th., = 32.5
Difference, or Monthly Range, = 38.7
"Corrected Mean" of all the Highest, (Col. 5), = 58.4
"Corrected Mean" of all the Lowest, (Col. 6), = 40.5
Difference, or Mean Daily Range, = 17.9
** Calculated Mean Temperature of Month, = 49.4
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), = 47.7
Mean (corrected) A.M. and P.M. Reading of Wet Bulb, (Cols. 10 and 12), = 44.2
Computed Temperature of Dew-Point, = 40.3
Do. Elastic Force of Vapour, = $.250$
Do. Weight of Vapour in a Cubic Foot of Air, =
Relative Humidity (Saturation = 100), = 76
RAIN fell on 19 Days; Amount in Inches, = 1.94

WIND.		SUMMARY.									
Direction.	N	NE	E	SE	S	SW	W	NW	Caln or Variable.	Mean Force.	Mean Velocity in miles per day.
A.M.	1	5	5	4	2	4	2	7	1	074	
P.M.	3	5	2	0	4	1	5	8	3	063	
Mean.	2	5	3	2	3	3	3	8	2	068	0.66

Observations made and
Return verified by

Charles Roy

(Signed)

James Roy

77.

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INSTRUCTIONS

FOR TAKING METEOROLOGICAL OBSERVATIONS

WITH REMARKS ON THE USE OF INSTRUMENTS.

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

The Council recommend that Observations be made precisely at 9 A.M. and 9 P.M. (Greenwich or Railway Time, if the latter be as specified in the following remarks, or at the City Time, if the latter be as specified in the following remarks). It is hoped that the utmost punctuality in the time of reading the instruments will be observed. Observers, in some few cases, find that it is impossible, in such instances, they are specially required, to mark opposite every reading the time at which it was taken, and to mark opposite every Weather-Glass and Anemometer, if not at 9 A.M. or 9 P.M. the time at which it was taken. Though well suited to indicate the variations of atmospheric pressure, are not fitted for scientific purposes. No Barometer should be used for Meteorological Observation that is not supplied with a scale 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 inconvenience 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 not 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.

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

It is absolutely necessary that the Barometer which is to be used shall have been compared with a Standard Barometer. The way to be followed should be the reading of a piece of white paper may be put behind the tube. It must be hung truly perpendicular, and cannot be set against a wall heated by a fire. The object being to secure that the whole instrument, including the brass fittings, the contained mercury, and the attached Thermometer, shall be, when read, at one uniform temperature, it is evident that the best position is that which is least liable to sudden changes of temperature.

In taking an observation, the Attached Thermometer is first noted; the tube must then be gently tapped, and the cistern-adjustment carefully made. The eye, by raising and lowering it, must be brought into the plane of the back and front of the index—usually the lower edge of the vernier, which must be carefully adjusted so as to form exactly a tangent to the convex surface of the mercury in the tube. Observations must be taken quickly, so as to prevent heat from the observer's hands and person from affecting the mercury. The use of a lens will facilitate an accurate adjustment and reading of the Barometer. A mistake not 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 1.000 inch, 0.500 inch, and 0.450 inch; that is to say, instead of 29.365 inches, either of the following is sometimes set down—viz. as 30.365 inches, 28.865 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 ivory 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 mercury not quite to the top of the tube, but within a quarter of an inch of it, and take down the instrument; it should then be carried with the cistern uppermost. Before suspending the Barometer for use, it must be ascertained whether the space above the mercury in the tube is a complete vacuum; this is the case if, on inclining the tube, the surface of the mercury is not depressed. If it is, the surface of the mercury must be got rid of. If a dull tap is heard, there is Barometer liable to be deranged by the introduction of air. In their tubes, on removal from place to place, or in being roughly handled, it may be useful to Observers to know how the air may be expelled. First close up the cistern by screwing the ivory peg tight, so as to prevent the escape of mercury; then screw up the mercury to about half an inch from the top of the tube; and having slowly inverted the instrument, place the top of it on a yielding substance, such as the book, 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 ivory peg, so as to prevent the escape of the mercury, and the float of the cistern, will flow out, and the

The Council of the Society recommend that the Self-Registering Thermometers, and the Dry and Wet Bulb Hygrometers, be kept in Stevenson's Improved Rectified Box, and that the Thermometers, put into the Rectified Box, be sealed outside, and sealed to four joint posts, and a length that when fixed in the ground. The posts to be sealed the Bulbs of the Minimum Thermometer, and of the Dry and Wet Bulb Thermometers, will be exactly at the same height of four feet above the ground, the Maximum Thermometer being immediately above the Minimum Thermometer. The thermometer Box is to be placed over a plot of grass, and in a level space to which the sun's rays have free access during summer months, and in which the thermometer is to be placed. The Thermometers are suspended on cross-laths in the Rectified Box, and face the door, which should open to the north. The Council regard the question of UNIFORMITY OF HEIGHT ABOVE GROUND, AND METHOD IN PHOTOGRAPHING THE THERMOMETERS, as of great importance, and recommend that the Thermometers be placed in every system of Meteorological Observation, since without this rendering it impossible to compare the climates of places with each other as regards their most important features.

Professor Phillips, and Negretti and Zambra's Maximum Thermometer, and Negretti and Zambra's Minimum Thermometer, are recommended. It is recommended that these Thermometers be graduated on the glass stem. The Minimum Thermometer is liable to two derangements—viz. the cistern 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 on by each Observer.

Fortunately, Spirit Thermometers may be easily set right by any one, when the column of spirit chances to separate. Let the Thermometer be taken in the hand by the end farthest from the bulb, raised above the head, and then forcibly swung down towards the feet; the object being, on the principle of centrifugal force, to 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 purpose; after which the thermometer should be placed in a slanting position, to allow the rest of the spirit still adhering to the sides of the tube to drain down to the bulb. But another method must be adopted, if the position of spirit in the top of the tube be small. Heat should be applied to the bulb and cautiously to the top end of the tube where the detached portion of spirit is, which, being turned into vapour by the heat will condense on the surface of the unbroken column; for, if this be done, the tube will break and the instrument must be destroyed. The best way to apply the requisite amount of heat is by bringing the end of the tube slowly down to a piece of heated flannel from a gas-burner; or, if gas be not at hand, a piece of heated metal will serve instead.

The bulbs of the Thermometers for registering the greatest heat from the sun's rays, and the least from radiation during night, have a black coating which may easily be renewed, or mended, by the application of a mixture of lampblack and printer's ink. They are placed in shallow blackened boxes, whose sides protect the bulbs from the sun and the Maximum should rest on wooden supports a few inches from the surface of the grass, in an open situation. Snow must not be allowed to cover either of these Thermometers; nor the sun's heat to affect the Minimum Thermometer by distillation. Black-bulbs enclosed in 'glass jackets' may also be used, being indeed preferable to the above. It must, however, be added, that the whole subject of the observation of Solar and Terrestrial Radiation is not yet in a sufficiently advanced state to warrant the exclusive recommendation of any one of these methods.

The Hygrometer in use at the Society's Stations consists of two Thermometers usually, but not necessarily, mounted on a single frame. As apparently slight deviations from dryness and wet bulb on one frame. The approved form of this apparatus is specially vitiate the Hygrometrical Observations, Observers are specially requested to attend to the following conditions:—The bulbs must hang down by at least an inch free from the scales and frame to which they are attached; the frame must be such as will bring the tubes forward by an inch from any board on which it may be suspended; the vitriol-cup must be covered, and altogether placed to the side, and a little below the level of the wet bulb, but in no case under the bulb; the muslin must be of medium fineness, and fastened at the back of the bulb by the cotton, which also supplies it with water. It must be seen to by the Observer that the muslin is always clean and free from the water pure. In frosty weather, the wet bulb must be much wetter, and must be made to drip. The bulb must be moistened by immersion from 15 to 20 minutes before the hour of observation. From the flask for use thus formed evaporation will proceed as from the moist cloth in ordinary circumstances.

In reading the Thermometer great care must be taken to bring or reading of the column of mercury. The reading ought to be taken to tenths of a degree, and noted in decimals. Thus the Thermometer will be read—39.9, 40.0, or 40.1; or again, 40.3, 40.5, 40.7, according as it indicates a little under, an exact, or a little over 40°. The reading of the Thermometer must be 40.3, 40.5, or 40.7, or 40.8, or 40.9, or 41.0, or 41.1, or 41.2, or 41.3, or 41.4, or 41.5, or 41.6, or 41.7, or 41.8, or 41.9, or 42.0, or 42.1, or 42.2, or 42.3, or 42.4, or 42.5, or 42.6, or 42.7, or 42.8, or 42.9, or 43.0, or 43.1, or 43.2, or 43.3, or 43.4, or 43.5, or 43.6, or 43.7, or 43.8, or 43.9, or 44.0, or 44.1, or 44.2, or 44.3, or 44.4, or 44.5, or 44.6, or 44.7, or 44.8, or 44.9, or 45.0, or 45.1, or 45.2, or 45.3, or 45.4, or 45.5, or 45.6, or 45.7, or 45.8, or 45.9, or 46.0, or 46.1, or 46.2, or 46.3, or 46.4, or 46.5, or 46.6, or 46.7, or 46.8, or 46.9, or 47.0, or 47.1, or 47.2, or 47.3, or 47.4, or 47.5, or 47.6, or 47.7, or 47.8, or 47.9, or 48.0, or 48.1, or 48.2, or 48.3, or 48.4, or 48.5, or 48.6, or 48.7, or 48.8, or 48.9, or 49.0, or 49.1, or 49.2, or 49.3, or 49.4, or 49.5, or 49.6, or 49.7, or 49.8, or 49.9, or 50.0, or 50.1, or 50.2, or 50.3, or 50.4, or 50.5, or 50.6, or 50.7, or 50.8, or 50.9, or 51.0, or 51.1, or 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73.4, or 73.5, or 73.6, or 73.7, or 73.8, or 73.9, or 74.0, or 74.1, or 74.2, or 74.3, or 74.4, or 74.5, or 74.6, or 74.7, or 74.8, or 74.9, or 75.0, or 75.1, or 75.2, or 75.3, or 75.4, or 75.5, or 75.6, or 75.7, or 75.8, or 75.9, or 76.0, or 76.1, or 76.2, or 76.3, or 76.4, or 76.5, or 76.6, or 76.7, or 76.8, or 76.9, or 77.0, or 77.1, or 77.2, or 77.3, or 77.4, or 77.5, or 77.6, or 77.7, or 77.8, or 77.9, or 78.0, or 78.1, or 78.2, or 78.3, or 78.4, or 78.5, or 78.6, or 78.7, or 78.8, or 78.9, or 79.0, or 79.1, or 79.2, or 79.3, or 79.4, or 79.5, or 79.6, or 79.7, or 79.8, or 79.9, or 80.0, or 80.1, or 80.2, or 80.3, or 80.4, or 80.5, or 80.6, or 80.7, or 80.8, or 80.9, or 81.0, or 81.1, or 81.2, or 81.3, or 81.4, or 81.5, or 81.6, or 81.7, or 81.8, or 81.9, or 82.0, or 82.1, or 82.2, or 82.3, or 82.4, or 82.5, or 82.6, or 82.7, or 82.8, or 82.9, or 83.0, or 83.1, or 83.2, or 83.3, or 83.4, or 83.5, or 83.6, or 83.7, or 83.8, or 83.9, or 84.0, or 84.1, or 84.2, or 84.3, or 84.4, or 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95.6, or 95.7, or 95.8, or 95.9, or 96.0, or 96.1, or 96.2, or 96.3, or 96.4, or 96.5, or 96.6, or 96.7, or 96.8, or 96.9, or 97.0, or 97.1, or 97.2, or 97.3, or 97.4, or 97.5, or 97.6, or 97.7, or 97.8, or 97.9, or 98.0, or 98.1, or 98.2, or 98.3, or 98.4, or 98.5, or 98.6, or 98.7, or 98.8, or 98.9, or 99.0, or 99.1, or 99.2, or 99.3, or 99.4, or 99.5, or 99.6, or 99.7, or 99.8, or 99.9, or 100.0, or 100.1, or 100.2, or 100.3, or 100.4, or 100.5, or 100.6, or 100.7, or 100.8, or 100.9, or 101.0, or 101.1, or 101.2, or 101.3, or 101.4, or 101.5, or 101.6, or 101.7, or 101.8, or 101.9, or 102.0, or 102.1, or 102.2, or 102.3, or 102.4, or 102.5, or 102.6, or 102.7, or 102.8, or 102.9, or 103.0, or 103.1, or 103.2, or 103.3, or 103.4, or 103.5, or 103.6, or 103.7, or 103.8, or 103.9, or 104.0, or 104.1, or 104.2, or 104.3, or 104.4, or 104.5, or 104.6, or 104.7, or 104.8, or 104.9, or 105.0, or 105.1, or 105.2, or 105.3, or 105.4, or 105.5, or 105.6, or 105.7, or 105.8, or 105.9, or 106.0, or 106.1, or 106.2, or 106.3, or 106.4, or 106.5, or 106.6, or 106.7, or 106.8, or 106.9, or 107.0, or 107.1, or 107.2, or 107.3, or 107.4, or 107.5, or 107.6, or 107.7, or 107.8, or 107.9, or 108.0, or 108.1, or 108.2, or 108.3, or 108.4, or 108.5, or 108.6, or 108.7, or 108.8, or 108.9, or 109.0, or 109.1, or 109.2, or 109.3, or 109.4, or 109.5, or 109.6, or 109.7, or 109.8, or 109.9, or 110.0, or 110.1, or 110.2, or 110.3, or 110.4, or 110.5, or 110.6, or 110.7, or 110.8, or 110.9, or 111.0, or 111.1, or 111.2, or 111.3, or 111.4, or 111.5, or 111.6, or 111.7, or 111.8, or 111.9, or 112.0, or 112.1, or 112.2, or 112.3, or 112.4, or 112.5, or 112.6, or 112.7, or 112.8, or 112.9, or 113.0, or 113.1, or 113.2, or 113.3, or 113.4, or 113.5, or 113.6, or 113.7, or 113.8, or 113.9, or 114.0, or 114.1, or 114.2, or 114.3, or 114.4, or 114.5, or 114.6, or 114.7, or 114.8, or 114.9, or 115.0, or 115.1, or 115.2, or 115.3, or 115.4, or 115.5, or 115.6, or 115.7, or 115.8, or 115.9, or 116.0, or 116.1, or 116.2, or 116.3, or 116.4, or 116.5, or 116.6, or 116.7, or 116.8, or 116.9, or 117.0, or 117.1, or 117.2, or 117.3, or 117.4, or 117.5, or 117.6, or 117.7, or 117.8, or 117.9, or 118.0, or 118.1, or 118.2, or 118.3, or 118.4, or 118.5, or 118.6, or 118.7, or 118.8, or 118.9, or 119.0, or 119.1, or 119.2, or 119.3, or 119.4, or 119.5, or 119.6, or 119.7, or 119.8, or 119.9, or 120.0, or 120.1, or 120.2, or 120.3, or 120.4, or 120.5, or 120.6, or 120.7, or 120.8, or 120.9, or 121.0, or 121.1, or 121.2, or 121.3, or 121.4, or 121.5, or 121.6, or 121.7, or 121.8, or 121.9, or 122.0, or 122.1, or 122.2, or 122.3, or 122.4, or 122.5, or 122.6, or 122.7, or 122.8, or 122.9, or 123.0, or 123.1, or 123.2, or 123.3, or 123.4, or 123.5, or 123.6, or 123.7, or 123.8, or 123.9, or 124.0, or 124.1, or 124.2, or 124.3, or 124.4, or 124.5, or 124.6, or 124.7, or 124.8, or 124.9, or 125.0, or 125.1, or 125.2, or 125.3, or 125.4, or 125.5, or 125.6, or 125.7, or 125.8, or 125.9, or 126.0, or 126.1, or 126.2, or 126.3, or 126.4, or 126.5, or 126.6, or 126.7, or 126.8, or 126.9, or 127.0, or 127.1, or 127.2, or 127.3, or 127.4, or 127.5, or 127.6, or 127.7, or 127.8, or 127.9, or 128.0, or 128.1, or 128.2, or 128.3, or 128.4, or 128.5, or 128.6, or 128.7, or 128.8, or 128.9, or 129.0, or 129.1, or 129.2, or 129.3, or 129.4, or 129.5, or 129.6, or 129.7, or 129.8, or 129.9, or 130.0, or 130.1, or 130.2, or 130.3, or 130.4, or 130.5, or 130.6, or 130.7, or 130.8, or 130.9, or 131.0, or 131.1, or 131.2, or 131.3, or 131.4, or 131.5, or 131.6, or 131.7, or 131.8, or 131.9, or 132.0, or 132.1, or 132.2, or 132.3, or 132.4, or 132.5, or 132.6, or 132.7, or 132.8, or 132.9, or 133.0, or 133.1, or 133.2, or 133.3, or 133.4, or 133.5, or 133.6, or 133.7, or 133.8, or 133.9, or 134.0, or 134.1, or 134.2, or 134.3, or 134.4, or 134.5, or 134.6, or 134.7, or 134.8, or 134.9, or 135.0, or 135.1, or 135.2, or 135.3, or 135.4, or 135.5, or 135.6, or 135.7, or 135.8, or 135.9, or 136.0, or 136.1, or 136.2, or 136.3, or 136.4, or 136.5, or 136.6, or 136.7, or 136.8, or 136.9, or 137.0, or 137.1, or 137.2, or 137.3, or 137.4, or 137.5, or 137.6, or 137.7, or 137.8, or 137.9, or 138.0, or 138.1, or 138.2, or 138.3, or 138.4, or 138.5, or 138.6, or 138.7, or 138.8, or 138.9, or 139.0, or 139.1, or 139.2, or 139.3, or 139.4, or 139.5, or 139.6, or 139.7, or 139.8, or 139.9, or 140.0, or 140.1, or 140.2, or 140.3, or 140.4, or 140.5, or 140.6, or 140.7, or 140.8, or 140.9, or 141.0, or 141.1, or 141.2, or 141.3, or 141.4, or 141.5, or 141.6, or 141.7, or 141.8, or 141.9, or 142.0, or 142.1, or 142.2, or 142.3, or 142.4, or 142.5, or 142.6, or 142.7, or 142.8, or 142.9, or 143.0, or 143.1, or 143.2, or 143.3, or 143.4, or 143.5, or 143.6, or 143.7, or 143.8, or 143.9, or 144.0, or 144.1, or 144.2, or 144.3, or 144.4, or 144.5, or 144.6, or 144.7, or 144.8, or 144.9, or 145.0, or 145.1, or 145.2, or 145.3, or 145.4, or 145.5, or 145.6, or 145.7, or 145.8, or 145.9, or 146.0, or 146.1, or 146.2, or 146.3, or 146.4, or 146.5, or 146.6, or 146.7, or 146.8, or 146.9, or 147.0, or 147.1, or 147.2, or 147.3, or 147.4, or 147.5, or 147.6, or 147.7, or 147.8, or 147.9, or 148.0, or 148.1, or 148.2, or 148.3, or 148.4, or 148.5, or 148.6, or 148.7, or 148.8, or 148.9, or 149.0, or 149.1, or 149.2, or 149.3, or 149.4, or 149.5, or 149.6, or 149.7, or 149.8, or 149.9, or 150.0, or 150.1, or 150.2, or 150.3, or 150.4, or 150.5, or 150.6, or 150.7, or 150.8, or 150.9, or 151.0, or 151.1, or 151.2, or 151.3, or 151.4, or 151.5, or 151.6, or 151.7, or 151.8, or 151.9, or 152.0, or 152.1, or 152.2, or 152.3, or 152.4, or 152.5, or 152.6, or 152.7, or 152.8, or 152.9, or 153.0, or 153.1, or 153.2, or 153.3, or 153.4, or 153.5, or 153.6, or 153.7, or 153.8, or 153.9, or 154.0, or 154.1, or 154.2, or 154.3, or 154.4, or 154.5, or 154.6, or 154.7, or 154.8, or 154.9, or 155.0, or 155.1, or 155.2, or 155.3, or 155.4, or 155.5, or 155.6, or 155.7, or 155.8, or 155.9, or 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SCOTTISH METEOROLOGICAL SOCIETY.

Observations taken at Barons Crag, Paisley County of Dumfriesin Lat. 55° 49' 50", Long. 5° 4' 5", Distance from Sea 10 miles.Height of Cistern of the Barometer above Mean Sea-Level 116 feet, above Ground 3 feet.During the MONTH of June 1891.

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. Temperature at 1 fathom and Density.	OZONE. 0-10.	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 h. A.M.		P.M.																			
		Barometer.	Attached Thermometer.	Barometer.	Attached Thermometer.	Max.	Min.	Max.	Min.	Dry bulb.	Wet bulb.	Dry bulb.	Wet bulb.		No. of hours in which it fell.	Direction.	Force.	Direction.	Force.	Velocity (0-10), and Species.	Amount (0-10), and Species.	Velocity (0-10), and Species.		Amount (0-10), and Species.																
		* No.	inches.	No.	inches.	No.	No.	No.	No.	No.	No.	No.	No.		No.	No.	No.	No.	No.	No.	No.	No.		No.	No.	No.	No.						No.	No.	No.	No.	No.	No.	No.	No.
		inches.	°	inches.	°	°	°	°	°	°	°	°	°		°	°	°	°	°	°	°	°		°	°	°	°						°	°	°	°	°	°	°	°
1	29.900	52	29.900	57	66.2	46.6			49	47.5	51.3	49		NE	1	NE	1.5		9	1												Clear, heavy, western	1							
2	29.820	52	29.950	57	64	47.5			57	54	53	52.6	340	NE	2	NE	1		8	8												Thunder 2-3.30 p.m.	2							
3	29.980	58	29.980	54	66	46.3			56.3	52.6	47.3	45		ENE	2	ENE	2		3	1												Clear	3							
4	29.840	59	29.880	54	62.5	42.5			53	48.5	50.5	47.3		E	2	E	2		2	5												Clear	4							
5	30.020	54	30.120	54	61.5	45.5			52	49	47.2	44		NE	2	ENE	1.5		9	-												Clear	5							
6	30.140	59	30.100	54	62.5	42.5			52	44	47.8	44.3		NE	1.5	NE	1.5		5	-												Clear	6							
7	30.050	55	30.072	54	60.2	39.6			50	47	49.3	45.5		ENE	5	SE	5		10	8												O.C. am. clear, m.	7							
8	30.102	54	30.130	54	59.5	43.5			52.5	47.3	49	46.5		NE	1	NE	1.5		5	1													Clear	8						
9	30.040	56	29.910	57	68.8	44			57.8	51.8	52.8	43.3		ENE	5	NW	5		-	3												O.C. p.m.	9							
10	30.000	63	30.100	61	66.5	43.8			58	51.3	54.8	51		NW	5	NNW	5		1	3												Clear, fine warm	10							
11	30.190	64	30.200	61	70.5	40.8			57.5	52	55.5	48.8		W	5	W	5		-	-													"	11						
12	30.360	66	30.320	62	67.2	43.5			61.5	54.6	56.2	49	020	calm	-	calm	-		1	1													"	12						
13	30.220	57	30.150	56	56.2	43.5			52	50	50.5	49	030	WSW	5	NNW	1.5		10	10													Dull & damp	13						
14	30.104	57	30.000	56	57	48.8			52.8	50	51.2	49	182	W	1	NW	5		9	10													Cloudy, fine	14						
15	29.820	56	29.876	59	59.5	47.5			54	52.2	52.2	51	030	WSW	1	NNW	1		10	10													Dull, much damp	15						
16	30.014	59	30.060	59	62.5	49.8			56.3	53	55.8	53	018	NNW	1	WSW	5		9	10													" am. clear, p.m.	16						
17	30.064	58	30.120	61	63.8	53.5			59.5	58	59.2	56.8	015	WSW	1	WSW	5		10	10													" mild shower	17						
18	30.140	61	30.224	60	64.5	55.3			59.6	57	57.3	56.3		SW	5	WSW	5		10	10													" mild	18						
19	30.290	60	30.220	65	72	55			57.8	56.8	58.5	56.5		SW	5	SW	5		10	-														Clear, warm	19					
20	30.360	69	30.320	69	80.2	53			70	64	65.8	61.3		SW	5	calm	-		-	1													" & hot	20						
21	30.340	69	30.290	67	80.5	55			66	57	64.8	56.5		NE	5	ENE	1		-	-													" & warm	21						
22	30.330	70	30.390	66	78.3	52.5			66.3	57.5	62.5	56.5		NE	1.5	NE	1		1	1													" breezy, fine	22						
23	30.310	73	30.150	66	83.2	54.5			70.3	60.8	60.3	55		NE	1	ENE	1.5		-	2													" warm	23						
24	30.064	64	30.060	66	75.3	57.5			60.2	57.2	62.3	59.6		ENE	1.5	NE	2		6	2													" fine	24						
25	30.010	70	29.850	66	77	56.3			65.2	61	61.8	59	425	NE	1	NE	1.5		5	8													" blousy, fine	25						
26	29.760	65	29.650	65	71	56.5			59.8	59	56.8	60.3	370	NE	1.5	NE	2		10	10														High 5 p.m.	26					
27	29.650	63	29.660	66	73	53.5			58	57.2	57.6	55.5		SE	5	W	1.5		10	3														Dull, heavy, much	27					
28	29.746	64	29.664	63	62.5	53.2			58.5	55.6	55.5	54.2	106	SE	1.5	SE	1.5		10	5														Clear, fine	28					
29	29.560	62	29.456	60	59.5	52.8			56.5	54	54.5	53	420	SE	1	SE	1.5		10	10														"	28					
30	29.440	60	29.500	60	61	53.6			55.3	54.5	55.5	55	623	SE	1	SW	5		10	10														Dull & much	29					
31	-	-	-	-	-	-			-	-	-	-		-	-	-		-	-															" Showery	30					
Sums.		10 43 13	12 11 2	13	13 9	14 13			15 9	15 7	15 13	16 7	2577	300	310			183	143																NOTATION USED IN GENERAL REMARKS.					
Means.		30.021	61.0	30.008	60.3	67.4	49.3		58.0	53.9	55.3	52.1		1.0	1.0			61	4.8																					
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.	aurora.	m.	meteor.
ci.	cirrus.	ms.	meteors.
ci-cu.	cirro-cumulus.	th.	thunder.
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.	snow.
f.	fog.	sc.	squall.
fr.	frost.	s.	sleet.
h. fr.	hoar-frost.	s. ha.	solar halo.
h.	haze.	sq.	squall.
h. d.	heavy dew.	sq.	squall.
hl.	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 $\frac{1}{100}$ for Temp. (Col. 2), = 29.934
"Corrected Mean" of Barometer at 9 P.M., minus the Correction $\frac{1}{100}$ for Temp. (Col. 4), = 29.922
Mean at Station, corrected, and at 32°, = 29.928
Correction for height, 116 feet above Mean Sea-level, = 1.27
Mean, reduced to 32°, and Sea-level, = 30.055
Highest Reading, corrected for Index error, on the th., = 30.390
Lowest Do. Do., on the th., = 29.410
Difference, or Monthly Range, = 0.980

S.-R. THERMOMETER, (in shade, etc.), Highest in Month, (corrected for Index Errors), on the th., = 83.2
Lowest in Month, corrected for Index errors, on the th., = 39.6
Difference, or Monthly Range, = 43.6
"Corrected Mean" of all the Highest, (Col. 5), = 67.4
"Corrected Mean" of all the Lowest, (Col. 6), = 49.3
Difference, or Mean Daily Range, = 18.1
** Calculated Mean Temperature of Month, = 58.4

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), = 56.6
Mean (corrected) A.M. and P.M. Reading of Wet Bulb, (Cols. 10 and 12), = 53.0
Computed Temperature of Dew-Point, = 49.7
Do. Elastic Force of Vapour, = .357
Do. Weight of Vapour in a Cubic Foot of Air, =
Relative Humidity (Saturation = 100), = 77
RAIN on 12 Days; Amount in Inches, = 2.58

WIND.		SUMMARY.			
Direction.		N	NE	E	SE
A.M.		6	11	2	3
P.M.		8	5	1	3
Mean.		0	7	8	0

Observations made and
Return verified by

James Hay

(Signed)

James Hay

77.

SCOTTISH METEOROLOGICAL SOCIETY.

Observations taken at Barons Cottage, County of Full, in Lat. $55^{\circ}49'50''$, Long. $5^{\circ}14'5''$, Distance from Sea $\frac{18}{10}$ miles.

Height of Cistern of the Barometer above Mean Sea-Level 116 feet, above Ground 13 feet.

During the MONTH of July 1888

The Hours of Observation are of Greenwich Time.

[illegible]

BAROMETER, "corrected Mean" at 9 A.M., *minus* the Correction \ddagger for Temp. (Col. 2), = $29.849 \dots - .089 \dots$ } = 29.760

"Corrected Mean" of Barometer at 9 P.M., minus the Correction †† } = 29.763
for Temp. (Col. 4), = 29.851 - 0.088

Mean at Station, corrected, and at 32°,..... = 29.762

Correction for height, 46 feet above Mean Sea-level,..... 127

Mean, reduced to 32°, and Sea-level, 29.889

Highest Reading, corrected for Index error, on the 14 th,..... = 30.360

Lowest Do. Do., on the 6 th,..... 29.370

Difference, or Monthly Range, 0.990

S.-R. THERMOMETER, (in shade, etc.), Highest in Month, (corrected for Index Errors), on the 15th,..... = 74.8

Lowest in Month, corrected for Index errors, on the 10 th, = 40.5

Difference, or Monthly Range, = 343

"Corrected Mean" of all the Highest, (Col. 5), = 65.3

"Corrected Mean" of all the Lowest, (Col. 6),..... 50.4

Difference, or Mean Daily Range, = 14.9

** Calculated Mean Temperature of Month, 57.8

S.-R. THERMOMETER, Black Bulb in Sun, Highest, (corrected for

Index Errors, on the	th,
(1) 1.375	(1) 1.5
0.331	1.73 11.75

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

Lowest at Night, Black Bulb (corrected for index errors), on the 10th, =

"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), = 56.7

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

10 and 12/3	35.8
** Clamshell Wagon and Trailer - of Deer Point	1.1

** De Elastic Forces of Mercury 327

** Do. Weight of Mercury in a Cubic Foot of Air.

** Relative Humidity (Saturation = 100) 82

IN fall on 20 Days: Amount in Inches - 44.8

WIND	SUMMARY
------	---------

Direction.	N	NE	E	SE	S	SW	W	NW	Calm or Variable.	Mean Force.	Mean Velocity in miles per day.
A.M.	2	2	1	0	2	5	11	8	0	1.0	
P.M.	0	2	0	0	0	4	11	10	4	0.7	
Mean.	1	2	0	0	1	5	11	9	2	0.85	0.72 <i>ch</i>

* 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 *misuse* of correction.

* These "Hygrometrical Deductions" are taken 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 in the "Calculated Mean Temperature."

** Any observations not taken under the Conditions specified in the Directions on the other side, or noted at the Top of each column, must be marked as such by the observer, in each Schedule. *See over.*

Observations made and
Return verified by

(Signed).

WJ

SCOTTISH METEOROLOGICAL SOCIETY.

Observations taken at Baron's Cottage, Ruthven, Buteshire, in Lat. 55° 49' 32" Long. 5° 4' 5" Distance from Sea 10 miles.

Height of Cistern of the Barometer above Mean Sea-Level 110 feet, above Ground 3 feet.

During the MONTH of August 1886.

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.	Days of Month.				
		9 h. A.M.		9 h. P.M.		Protected in Shade, 4 feet above Ground.		Exposed Black Bulbs, 5 ft. above Ground.		9 h. A.M.		9 h. P.M.			9 h. A.M.		9 h. P.M.		9 A.M.		P.M.							9 h. A.M.			
		Barometer.	Attached Thermometer.	Barometer.	Attached Thermometer.	Max.	Min.	Max.	Min.	Dry bulb.	Wet bulb.	Dry bulb.	Wet bulb.	No. of hours in which it fell.	No.	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.			
		* No.	inches.	°	inches.	°	°	°	°	°	°	°	°	°	No.										°	°		°			
	1	29.844	60	29.770	61	66.3	46.5	57.2	56.3	56	54	0.020	W	5	WSW	5			10	8						Dull & mild	1				
	2	29.646	62	29.550	62	64	51	58.5	55.8	52	50	0.08	SW	1.5	W	5			7	8						Clear fine	2				
	3	29.490	60	29.566	60	60.8	49.5	56.5	54	53	50.5	1.30	SW	5	SE	5			9	8						" " Showers	3				
	4	29.600	64	29.730	61	69	57.5	60.5	56.5	57	57	4.50	ESE	1	E	5			8	10						Dull & drizzle	4				
	5	29.820	64	29.920	63	71	47.5	56.5	56	57	55	—	E	5	NW	5			2	8						Clear fine	5				
	6	29.970	61	29.970	59	62.5	47	56	51.5	54	50	0.30	NW	5	NW	1			10	10						" " "	6				
	7	29.960	59	29.940	60	62	54	55.5	55	56	56	2.80	W	5	SW	5			10	10						Dull	7				
	8	29.844	59	29.776	62	61	54.5	57.5	57	58.5	58.5	4.42	SW	5	SW	5			10	10						Dull	8				
	9	29.620	59	29.636	61	61.8	54.2	57.8	57	57	56	0.15	SW	5	WSW	5			10	8						" " "	9				
	10	29.780	60	29.900	62	64.5	53	57.2	56.5	54.5	52.2	0.50	NW	1	W	5			8	8						Clear fine	10				
	11	29.750	60	29.650	59	60	51.8	54	53	54	51	2.05	S	1.5	SW	1			10	5						Dull & mist fair fine	11				
	12	29.460	58	29.610	58	59	52	53.5	52	53	52	2.00	SW	1	SW	1			10	3						" " "	12				
	13	29.820	57	29.850	59	61.8	51	55.5	53	54	52.5	5.20	NW	1	calm	—			9	8						Clear fine	13				
	14	29.770	57	29.794	59	63.2	53.2	56.5	56.2	54.5	53.5	0.55	calm	—	NW	1			10	8						Dull & calm - Showers	14				
	15	29.712	57	29.790	58	63.2	51.5	56.3	54	54	52	0.15	SW	1	NW	1.5			9	8						Clear - heavy slight Showers	15				
	16	29.904	62	29.900	60	67.2	48.5	60.5	55.5	52.5	50.2	0.12	NW	5	calm	—			8	8						" " "	16				
	17	29.700	57	29.460	58	57.5	48.5	54	52.5	55.5	53.3	1.30	E	1.5	ESE	1			10	10						Dull light drizzle	17				
	18	29.520	61	29.444	60	71.2	51	59.5	58	56.5	53	0.08	SE	5	ESE	5			5	10						Clear fine	18				
	19	29.400	60	29.484	61	67.5	52.5	59.2	56.2	54.8	53.3	0.10	ESE	1.5	ESE	5			9	8						Cloudy and mist	19				
	20	29.534	62	29.480	62	64.5	52.5	61.3	58.5	53.5	53	1.70	E	5	calm	—			9	10						Showers	20				
	21	29.490	59	29.620	60	67.5	50	57	55	51.5	50.5	0.58	calm	—	calm	—			8	8						Clear fine Showers	21				
	22	29.680	57	29.770	60	67.5	48	58	55	54.8	54.8	0.05	NW	5	calm	—			9	9						Clear	22				
	23	29.780	66	29.750	62	67.2	45.8	61	54.8	48.5	47	—	NE	1	NW	5			8	5						Clear, warm	23				
	24	29.640	58	29.420	58	59	45.5	58.8	55.5	55	54.2	7.80	SE	1	calm	—			10	10						Dull & mist	24				
	25	29.270	59	28.910	59	59	51.5	55.5	53	53.5	53.3	9.95	SW	1.5	calm	—			9	10						" " "	25				
	26	29.050	59	29.510	59	63	50	55.3	53	54	52.5	0.70	W	2	calm	—			9	8						Clearly Showers	26				
	27	29.300	57	29.250	68	63.5	46.5	56.5	54.2	47.5	46.5	1.70	calm	—	calm	—			8	—						Clear Showers	27				
	28	29.384	58	29.630	58	61.5	45	54	49.5	47	45.5	—	WSW	1.5	calm	—			7	—						Clearly	28				
	29	29.800	60	29.940	55	62.5	42.5	52	49.2	43	41.8	0.12	W	1	NW	5			7	—						Clear Showers	29				
	30	29.920	54	29.664	57	63.8	40.3	53	50.5	53.8	51.5	1.60	NE	5	S	1.5			9	8						Clear	30				
	31	29.330	56	28.930	57	60	49	56	55	57	56	3.70	S	5	SW	2			9	8						Dull Showers & mist fine	31				
Sums.		19 788	1842	19 614	1858	1981.5	1541.3	1761.2	1681.0	1666.0	1616.1	6.37							266	232											
Means.		29.638	59.4	29.633	59.9	63.9	49.7	56.8	54.2	53.7	52.1								8.6	7.5											
Total Corrections for Instrumental Errors.																			0.6	0.6											
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.	"	ms.	"	meteors.	
ci.-cu.	"	ciro-cumulus.	n.	"	minibus.
cu.	"	cirrus.	r.	"	rain.
cu.-s.	"	cumulus.	c. h. r.	"	heavy rain.
d.	"	cumulo-stratus.	s.	"	continued heavy rain.
f.	"	dew.	sc.	"	stratus.
fr.	"	fog.	s.	"	scud.
h.-fr.	"	frost.	s.	"	sleet.
h.	"	hoar-frost.	so ha.	"	snow.
h. d.	"	hoar.	solar halo.	"	solar halo.
h. d.	"	heavy dew.	sq.	"	squall.
hl.	"	hail.	sgs.	"	squalls.
l.	"	lightning.	t.	"	thunder.
li. cl.	"	light clouds.	t. s.	"	thunder-storm.
li. sh.	"	light showers.	w.	"	wind.
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 very hard
1	Light air	3	Very fresh	6	Violent gale

BAROMETER, "corrected Mean" at 9 A.M., minus the Correction $\frac{1}{2}$ for Temp. (Col. 2), = 29.538
 "Corrected Mean" of Barometer at 9 P.M., minus the Correction $\frac{1}{2}$ for Temp. (Col. 4), = 29.530
 Mean at Station, corrected, and at 32°, = 29.554
 Correction for height, 116 feet above Mean Sea-level, = .127
 Mean, reduced to 32°, and Sea-level, = 29.681
 Highest Reading, corrected for Index error, on the 6th, = 29.978
 Lowest Do. Do., on the 25th, = 28.910
 Difference, or Monthly Range, = 1.060

S.-R. THERMOMETER, (in shade, etc.), Highest in Month, (corrected for Index Errors), on the 18th, = 71.2
 Lowest in Month, corrected for Index errors, on the 30th, = 40.3
 Difference, or Monthly Range, = 30.9
 "Corrected Mean" of all the Highest, (Col. 5), = 63.9
 "Corrected Mean" of all the Lowest, (Col. 6), = 49.7
 Difference, or Mean Daily Range, = 14.2
 ** Calculated Mean Temperature of Month, = 56.8
 S.-R. THERMOMETER, Black Bulb in Sun, Highest, (corrected for Index Errors), on the 18th, = 71.2
 "Corrected Mean," (Col. 7), of Black Bulb, Max. in Sun, = 63.9
 Lowest at Night, Black Bulb (corrected for Index errors), on the 30th, = 40.3
 "Corrected Mean," (Col. 8), of Black Bulb, Min. on grass, = 49.7
 Difference of above means or range ("exposed"), = 30.9

HYGROMETER, Mean (corrected) A.M. and P.M. Reading of Dry Bulb, (Cols. 9 and 11), = 55.2
 Mean (corrected) A.M. and P.M. Reading of Wet Bulb, (Cols. 10 and 12), = 53.1
 # Computed Temperature of Dew-Point, = 51.1
 # Do. Elastic Force of Vapour, = .376
 # Do. Weight of Vapour in a Cubic Foot of Air, = —
 # Relative Humidity (Saturation = 100), = 87
 RAIN fell on 28 Days; Amount in Inches, = 6.370

WIND.		SUMMARY.									
Direction.		N	NE	E	SE	S	SW	W	NW	Calm or Variable.	Mean Force.
A.M.		1	2	5	1	3	7	6	3	3	0.8
P.M.		0	0	4	1	1	5	4	6	10	0.5
Mean.		1	1	4	1	2	6	5	4	7	0.65 = 0.42 m

Observations made and Return verified by

James Kay

(Signed)

James Kay

3115

Received at the N. B. Edinburgh
on the 30th Oct. two late
for insertion in report

SCOTTISH METEOROLOGICAL SOCIETY.

Observations taken at Baroncotter, County of Dumfries, in Lat. 55° 49' 50", Long. 5° 45', Distance from Sea 10 miles.

Height of Cistern of the Barometer above Mean Sea-Level 116 feet, above Ground 3 feet.

During the MONTH of September 1887.

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.				SUNSHINE. H ours.	SEA.	OZONE.	GENERAL REMARKS.	Days of Month.					
		9 h. A.M.		9 h. P.M.		Protected in Shade, 4 feet above Ground.		Exposed Black Bulbs, 4 feet above Ground.		9 h. A.M.		9 h. P.M.			9 h. A.M.		9 h. P.M.		9 A.M.		P.M.		9 h. A.M.													
		Barometer.	Attached Thermometer.	Barometer.	Attached Thermometer.	Max.	Min.	Max.	Min.	Dry bulb.	Wet bulb.	Dry bulb.	Wet bulb.		Direction.	Force.	Direction.	Force.	Velocity (0-6) and Direction.	Amount (0-10), and Species.	Velocity (0-6) and Direction.	Amount (0-10), and Species.	No. 1. inches.	No. 2. inches.	No. 3. inches.											
		* No.		No.		No.	No.	No.	No.	Dry bulb.	Wet bulb.	Dry bulb.	Wet bulb.		No. of hours in which it fell.	No.	No.	No.	No.	No.	No.	No.	No.	No.	No.	No.										
		inches.	°	inches.	°	°	°	°	°	°	°	°	°		°									°	°	°										
	1	28.750	56	29.050	58	58.5	52.5			54	52.2	54.5	52		350	S	2	SW	2		10	10														
	2	29.350	61	29.620	57	62	51			57	54.5	53	48.8		020	SW	2	SW	1.5		8	8											2			
	3	29.850	67	29.860	59	68	45			60	55	53	51		3	SE	5			3	6												3			
	4	29.900	66	29.930	58	69.2	46.2			60	55.5	49	47.5		150	E	5	calm		2													4			
	5	29.860	56	29.610	57	59	47			53	52	55	52.5		450	SW	5	SW	1.5		10	10											5			
	6	29.560	56	29.660	56	60.8	49			53	50.5	50.5	49		090	WSW	1	W	5		5	8											6			
	7	29.860	61	29.950	56	63.5	46.5			57	52.5	46	45.5		240	W	5	calm		5	1												7			
	8	29.750	53	29.890	54	56.5	45			48.8	48	55.2	55		323	ESE	1	calm		10	10												8			
	9	29.970	56	30.020	58	62	54.8			58	58	57.5	56		090	ESE	1.5	calm		10	10												9			
	10	30.040	59	30.060	60	73.5	49.5			61	59	58	57		005	SSE	5	calm		2	10													10		
	11	30.080	61	30.032	63	72	56			62	60.6	56	55		SW	5	calm		9	1														11		
	12	30.020	61	29.970	63	76	51			64	62	55	54		E	5	calm																	12		
	13	29.862	63	29.720	63	78	50.5			64	61.5	58	57		272	NE	5	calm																	13	
	14	29.740	59	29.740	59	59.5	49.2			53.5	51.5	52.2	50		150	W	1	W	5		10	8												14		
	15	29.980	57	30.090	58	60	46.3			52	49.5	54	52.5		113	W	1	W	1.5		5	10												15		
	16	30.064	57	29.960	58	61.6	53.5			55.2	54.8	57	55.3		106	WSW	1	SW	1.5		10	10												16		
	17	29.814	57	29.740	59	59.5	55			57.2	57	58	56.8		175	SW	1	W	5		10	10												17		
	18	29.700	59	29.750	60	62.3	53			58.5	55	54.2	52.5		WSW	1	SW	5		9	8													18		
	19	29.812	60	29.860	57	61.2	50			56.5	54.5	51	49.6		008	WSW	5	calm		10	10													19		
	20	29.740	55	29.720	55	61.8	48.5			52	50.5	49	48		385	NE	5	calm		10	10													20		
	21	29.730	52	29.840	51	51	46.8			48.5	45	48	44.5		015	WNW	1	WNW	1		10	9												21		
	22	29.980	57	30.040	53	64	44.3			54.8	49.5	47.2	44		111	ENE	5	ENE	1.5		1	5												22		
	23	30.070	50	30.040	53	55.3	40			49	46.5	52.3	50.5		260	ENE	5	ENE	5		10	10												23		
	24	29.850	53	29.960	55	63	50.6			54	53.5	53	51.5		060	SE	1	SE	5		10													24		
	25	30.010	57	29.640	55	63	49			58	55	54.5	53.6		340	S	1	SSE	2.3		5	10												25		
	26	29.340	55	29.344	55	59.8	49			54	49.8	51.2	50		450	SW	2	WSW	2.3		2	5												26		
	27	29.604	57	29.850	56	57	48			54	48.3	53	52.2		120	W	3	W	1		2	5												27		
	28	29.700	56	29.634	57	59.5	51			54.3	53.5	58	57.5		300	SW	1	S	1		10	10												28		
	29	29.610	58	29.590	57	61	50.5			57.5	53.5	52.8	49		018	SW	1.5	W	1		5	1												29		
	30	29.410	54	29.390	57	56.8	49			53	51.5	50	48		230	SSE	1.5	SW	5		10	10												30		
	31																																			31
	Sums.	23026	229	23560	217	753	177			1728	1002	974	478		105	305	215		203	214																
	Means.	29.768	57.6	29.785	57.2	62.5	49.3			55.8	53.3	53.2	51.6						68	7.1																
	* Total Corrections for Instru- mental Errors.																																			
	+ Corre- ctions for Diurnal Range.																																			
	"Cor- rected 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.	" "	ms.	" "
ci-cu.	" "	n.	" "
ci-s.	" "	r.	" "
cu.	" "	h. r.	" "
cu-s.	" "	c. h. r.	" "
d.	" "	s.	" "
f.	" "	sc.	" "
fr.	" "	s.	" "
h. fr.	" "	so. h.	" "
h.	" "	sq.	" "
h. d.	" "	sqs.	" "
hl.	" "	t.	" "
li. d.	" "	th.	" "
li. sh.	" "	th. st.	" "
lu. co.	" "	w.	" "
lu. ha.	" "	g.	" "

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), = 29.768
"Corrected Mean" of Barometer at 9 P.M., minus the Correction for Temp. (Col. 4), = 29.785
Mean at Station, corrected, and at 32°, = 29.699
Correction for height, feet above Mean Sea-level, = 137
Mean, reduced to 32°, and Sea-level, = 29.826
Highest Reading, corrected for Index error, on the 15th, = 30.090
Lowest Do. Do., on the 1st, = 28.750
Difference, or Monthly Range, = 1.340

S-R. THERMOMETER, (in shade, etc.), Highest in Month, (corrected for Index Errors), on the 13th, = 78.6
Lowest in Month, corrected for Index errors, on the 23th, = 48.0
Difference, or Monthly Range, = 30.6
"Corrected Mean" of all the Highest, (Col. 5), = 62.5
"Corrected Mean" of all the Lowest, (Col. 6), = 49.3
Difference, or Mean Daily Range, = 13.2
** Calculated Mean Temperature of Month, = 55.2

S-R. THERMOMETER, Black Bulb in Sun, Highest, (corrected for Index Errors), on the 13th, = 78.6
"Corrected Mean," (Col. 7), of Black Bulb, Max. in Sun, = 62.5
Lowest at Night, Black Bulb (corrected for Index errors), on the 23th, = 48.0
"Corrected Mean," (Col. 8), of Black Bulb, Min. on grass, = 49.3
Difference of above means or range ("exposed"), = 30.6

HYGROMETER, Mean (corrected) A.M. and P.M. Reading of Dry Bulb, (Cols. 9 and 11), = 54.5
Mean (corrected) A.M. and P.M. Reading of Wet Bulb, (Cols. 10 and 12), = 52.4
Computed Temperature of Dew-Point, = 50.3
Do. Elastic Force of Vapour, = 365
Do. Weight of Vapour in a Cubic Foot of Air, = 86
Relative Humidity (Saturation = 100), = 86
RAIN fell on 23 Days; Amount in Inches, = 4.72

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

Observations made and
Return verified by

James Kay

(Signed)

James Kay

SCOTTISH METEOROLOGICAL SOCIETY.

Observations taken at Barone Cottage, Fochty, Buteshire, in Lat. 56° 49' 50" Long. 5° 45', Distance from Sea 10 miles.

Height of Cistern of the Barometer above Mean Sea-Level 116 feet, above Ground 3 feet.

During the MONTH of October 1889.

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. H. mrs.	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, & feet above Ground.		Exposed Black Bulbs. Max. in. Min. on Sunray & Cross.		9 h. A.M.		9 h. P.M.			9 h. A.M.		9 h. P.M.		9 A.M.		P.M.			9 h. A.M.										
		Barometer.	Attached Thermometer.	Barometer.	Attached Thermometer.	Max.	Min.	Max.	Min.	Dry bulb.	Wet bulb.	Dry bulb.	Wet bulb.		No. of hours in which it fell.	No.	Direction.	Force.	Direction.	Force.	Readings of the H. Cup Anemometer No.	Velocity (0-6) and Direction.		Amount (0-10). and Species.	Velocity (0-6) and Direction.	Amount (0-10). and Species.					No.	No.	No.	
		* No.		No.		No.	No.	No.	No.													9 h. A.M.										3 inches.	12 inches.	22 inches.
		Inches.	°	Inches.	°	°	°	°	°	°	°	°	°		°	°	°	°	°	°	°	°		°	°	°					°	°	°	°
	1	29.320	55	29.460	53	58.5	45.3			50	48	50	46	336	SW	5	YN	1			2	10								9 am to 9 pm				
	2	29.664	57	29.870	55	58	45			51	48.8	49.5	47.5	172	WN	5	SW	5			5	5								1/2 clear brassy light showers	2			
	3	29.880	53	29.960	59	57	48			53	52	55.5	54.6	008	S	1	SSW	1			10	10								3/4 " fine	3			
	4	29.930	55	29.890	56	57	53			54.8	53	55	53	020	SSW	1.5	S	1.5			10	10								Dull & raw	4			
	5	29.690	56	29.250	56	60.5	51.5			53	50	55	51	540	SSW	1.5	SSW	2			10	10								1/2 B. O. P.M.	5			
	6	29.910	55	29.500	55	59	44.5			53.8	53.5	47	45.5	150	SSW	1	SSW	5			10									1/2 Dull & mild showers	6			
	7	29.172	54	29.400	53	60	45			55	53	48	45.8		SSW	1	SSW	5			9									1/2 clear brassy fine	7			
	8	29.532	54	29.220	54	61	44.8			53.2	50.2	50	49.5	820	S	1	S	1.5			5	10								1/2 " B. O. P.M.	8			
	9	29.262	54	29.530	54	60	48.5			52.4	48.5	49	46		S	1.5	SW	5			5	2								1/2 " brassy fine	9			
	10	29.620	54	29.480	54	60.6	45.8			53	50	51.5	50	075	SW	1	S	1.5			2	7								3/4 " brassy "	10			
	11	29.130	53	28.950	52	54	47.5			51	50	48.5	46.2	350	SSW	1.5	SW	1.5			10	2								Dull stormy & wet	11			
	12	29.122	54	29.220	55	59.5	44			50	46.8	46	44	120	S	1.5	SE	5			2	10								1/2 " clear fine, chilly	12			
	13	29.120	52	28.020	51	51.5	40			46	44.5	47	45.5	490	SSW	1	SW	3-3.5			5	10								Dull brassy stormy	13			
	14	28.720	50	29.180	51	55	40			48	44	49	45.5	130	SSW	1.5	SW	2			10	10								1/2 brassy fine	14			
	15	29.180	49	29.380	49	55.5	43			46	44.5	44.3	42	278	WSW	5	WSW	5			10	8								1/2 B. O. P.M.	15			
	16	28.960	49	29.610	52	54.5	38.8			48.3	46	47	46	433	SE	1	W	1.5			10	10								Dull brassy showers	16			
	17	29.460	50	29.710	50	55	42.2			47.2	45	41.8	41	220	WNW	5	WNW	5			5	5								1/2 clear choppy	17			
	18	29.770	49	29.274	50	45.5	38.8			46.5	40.2	48.5	47.5	660	SSW	5	S	3			8	10								Dull B. O. P.M.	18			
	19	29.200	52	29.240	50	53	41.5			45.5	43	42.40.8		058	SW	1	SSW	1			5	7								1/2 clear fine showers	19			
	20	29.592	49	29.040	51	57	40			46.2	44.8	48	47	375	SE	1	SE	1			8	10								1/2 " " B. O. P.M.	20			
	21	28.870	49	28.900	50	56.3	43.5			47.5	46.5	48	46.5	033	SE	1.5	SE	1.5			10	9								Dull & wet part pm	21			
	22	28.960	50	29.120	50	55	40			46.2	45.5	42.5	42	036	SE	5	calm				9	5								1/2 clear fine	22			
	23	29.260	49	29.450	48	53.8	36.8			43.3	43	40	39	088	E	5	calm				5									1/2 " showers pm	23			
	24	29.666	52	29.780	47	52	36.2			47	45.3	35.3	34		WN	5	calm				2									3/4 " fine	24			
	25	29.870	46	29.990	44	54.5	31.5			38.8	38	43.5	41.8		calm		NE	1												1/2 clear	25			
	26	30.110	46	30.160	47	54	42.3			45.8	43.3	43.5	42		NE	1	ESE	1			2	2								1/2 " brassy fine	26			
	27	30.210	46	30.250	47	54	42.5			45	42.8	43.8	41.2		NE	1	ENE	1			5	5								1/2 " "	27			
	28	30.250	47	30.240	47	55	40			43	40.5	42.5	40.5		ENE	1	ENE	5												1/2 clear & fine	28			
	29	30.396	45	30.490	45	52.5	33.3			26.8	26.3	26	25.2		calm		calm				1									" "	29			
	30	30.550	44	30.580	44	49.5	34.5			39.3	38.6	35.5	34.5		ENE	5	calm				1									" hazy "	30			
	31	30.640	43	30.610	44	48.6	35.5			47.5	36.5	41	39		calm		SE	5												" "	31			
	Sums.	18.0		14.14		167	1210			135	129	157	157	5412		270	3.10			146	167													
	Means.	581		507		507	42.0			47.9	45.7	46.0	44.2			0.9	10			5.7	5.6													
	Total Corrections for Instrumental Errors.																																	
	Corrections for Diurnal Range.																																	
	Corrected Means.																																	
	No. of Column.	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30			

NOTATION USED IN GENERAL REMARKS.					
a.	denotes aurora.	m.	denotes meteor.		
ci.	" cirrus.	ms.	" meteors.		
ci-cu.	" 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. h.	" snow.		
h.	" haze.	so. ha.	" solar halo.		
h. d.	" heavy dew.	sq.	" squall.		
hl.	" hail.	squ.	" 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 gale
1	Light air	3	Very fresh	6	Violent gale

BAROMETER, "corrected Mean" at 9 A.M., minus the Correction $\frac{1}{10}$ for Temp. (Col. 2), = 29.522

"Corrected Mean" of Barometer at 9 P.M., minus the Correction $\frac{1}{10}$ for Temp. (Col. 4), = 29.514

Mean at Station, corrected, and at 32', = 29.518

Correction for height, 116 feet above Mean Sea-level, = .127

Mean, reduced to 32', and Sea-level, = 29.645

Highest Reading, corrected for Index error, on the 31st th., = 30.640

Lowest Do. Do., on the 14th, = 28.020

Difference, or Monthly Range, = 2.620

S.-R. THERMOMETER, (in shade, etc.), Highest in Month, (corrected for Index Errors), on the 8th, = 61.0

Lowest in Month, corrected for Index errors, on the 25th, = 31.5

Difference, or Monthly Range, = 29.5

"Corrected Mean" of all the Highest, (Col. 5), = 55.4

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

Difference, or Mean Daily Range, = 13.4

** Calculated Mean Temperature of Month, = 48.7

S.-R. THERMOMETER, Black Bulb in Sun, Highest, (corrected for Index Errors), on the 8th, = 61.0

"Corrected Mean," (Col. 7), of Black Bulb, Max. in Sun, = 55.4

Lowest at Night, Black Bulb (corrected for Index errors), on the 25th, = 31.5

"Corrected Mean," (Col. 8), of Black Bulb, Min. on grass, = 42.0

Difference of above means or range ("exposed"), = 13.4

HYGROMETER, Mean (corrected) A.M. and P.M. Reading of Dry Bulb, (Cols. 9 and 11), = 47.0

Mean (corrected) A.M. and P.M. Reading of Wet Bulb, (Cols. 10 and 12), = 45.0

Computed Temperature of Dew-Point, = 42.8

Do. Elastic Force of Vapour, = .275

Do. Weight of Vapour in a Cubic Foot of Air, = 86

Relative Humidity (Saturation - 100), = 86

RAIN fell on 21 Days; Amount in Inches, = 5.412

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	2	5	4	10	3	2	2	3	0.9	
P.M.	0	1	3	3	9	5	4	0	6	1.0	
Mean.	0	1.4	4	4	9.4	3	1	3	4.5	0.95	0.90 m.p.h.

* 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 May

(Signed) James May

SCOTTISH METEOROLOGICAL SOCIETY.

Observations taken at *Barone Cottage, Rathodry*, County of *Bute*, in Lat. $55^{\circ}49'50''$, Long. $5^{\circ}41'5''$, Distance from Sea $\frac{8}{10}$ miles.Height of Cistern of the Barometer above Mean Sea-Level 116 feet, above Ground 3 feet.During the MONTH of *November* 188*9*.

The Hours of Observation are of Greenwich Time.

ELECTRICITY.	Days of Month.	BAROMETER.				SELF-REGISTERING THERMOMETERS. Read Daily, at 8 P.M.				HYGROMETER.				Rain.		WIND.				CLOUDS.				THERMOMETERS under Ground.	SEA.	OZONE.	GENERAL REMARKS.	Days of Month.			
		9 h. A.M.		9 h. P.M.		Protected in Shade, 4 feet above Ground.		Exposed Black Bulbs, Sun's rays on Grass.		Dry No. Wet No.		9 h. A.M. 9 h. P.M.		No. of hours in which it fell.		9 h. A.M. 9 h. P.M.		Readings of the H. Cup Anemometer.		9 A.M. P.M.											
		Barometer.	Attached Thermometer.	Barometer.	Attached Thermometer.	Max.	Min.	Max.	Min.	Dry bulb.	Wet bulb.	Dry bulb.	Wet bulb.	No.	No.	Direction.	Force.	Direction.	Force.	No.	9 h. A.M.	Velocity (0-6) and Direction.	Amount (0-10) and Species.						Velocity (0-6) and Direction.	Amount (0-10) and Species.	
		* No.	No.	No.	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	30.600	45	30.592	49	50.5	40	48	46.2	40.8	45.3	~	ENE 5 E 1	9	9											1					
	2	30.560	50	30.520	49	53.3	45.5	47.5	46	48	45.6	~	NE 5 ENE 5	10	10											2					
	3	30.480	48	30.444	49	55.5	41.2	44.2	42	45.5	42	~	NE 5 NE 5	10	10											3					
	4	30.500	48	30.614	49	51	42.3	45.6	43.6	44	41.5	~	ENE 5 ENE 5	10	10											4					
	5	30.620	47	30.530	48	45.2	41	43	41.2	43	41.5	~	calm	9	10											5					
	6	30.420	47	30.514	48	47.5	41	42.3	41.6	45.5	44.5	078	calm	10	10											6					
	7	30.284	49	30.112	48	56.5	41.6	44	43.5	45	42	~	calm	5	2											7					
	8	29.780	47	29.360	49	48.3	43.3	46	42.3	46.5	45.6	276	S 1.5 S 1.5	8	10											8					
	9	29.240	48	29.150	47	48.8	41	45.3	42	42.2	40	110	SW 1 SW 5	9	5											9					
	10	29.260	47	29.140	45	46	38	41	39	41	39.5	200	SSW 5 SSW 5	8	10											10					
	11	28.540	45	28.600	48	46	39.5	44.2	42.8	40.2	39.3	368	ENE 1 W 2-3	10	10											11					
	12	29.060	45	29.120	48	50.5	38.5	41.6	37	43.5	41	020	SW 1 ESE 1.5	1	8											12					
	13	28.980	47	28.974	47	47	41.5	45.6	41.5	41.5	41.3	640	ESE 1 calm	10	10											13					
	14	29.106	47	29.250	47	48	38.5	43.3	41.5	43.5	42	072	SE 1 ENE 5	8	8											14					
	15	29.350	45	29.480	46	46.5	40.5	43.2	42.5	42.5	42.2	~	NE 5 NE 5	10	2											15					
	16	29.530	45	29.530	45	50.5	39	41.2	40.3	40.5	38.5	390	NE 5 SE 5	6	10											16					
	17	29.550	45	29.700	45	48.5	36.6	37	36.5	37	36.5	030	calm	8	8											17					
	18	29.650	45	29.460	47	52	35.5	41.5	41	45.3	44.5	432	SE 1 calm	10	8											18					
	19	29.540	48	29.560	50	51	44	48.5	44.3	47	45.5	440	SW 1 WNW 5	9	10											19					
	20	29.600	48	29.750	46	48.2	36	43.8	42.3	41.5	35.5	095	WSW 5 calm	8	-											20					
	21	29.800	45	29.830	44	48.6	35	39.2	38.5	36.2	34	~	calm	8	2											21					
	22	29.804	41	29.760	42	46	31.2	33	31.5	36.8	35	~	calm	1	10											22					
	23	29.720	40	29.720	41	41.6	30.5	36.3	35.3	36.5	36	~	SW 5 calm	8	10											23					
	24	29.760	40	29.640	39	43.5	30.6	31	30.5	32.3	32	158	WNW 5 calm	1	-											24					
	25	29.410	41	29.464	43	43.3	33	40	39.5	36	35.5	610	SW 5 calm	10	10											25					
	26	29.410	42	29.534	39	37.5	30	36.5	35.5	32	31.5	320	SW 5 calm	9	-											26					
	27	29.620	37	29.680	38	40.6	24.5	29	28.5	36.5	35	~	WNW 5 SW 5	-	10											27					
	28	29.360	41	29.210	43	48.5	35.5	40	38	43.8	41.8	240	SEWSW 3 2	10	2											28					
	29	29.410	45	29.580	43	46	38.8	42.3	40	40	38	020	WSW 1 SW 5	5	-											29					
	30	29.510	43	29.520	45	47.6	37.2	43.2	41	42.8	41.5	110	3 1 calm	10	10											30					
	31																									31					
Sums.		15 12 13	15	15 12 13	15	14 10 12 13	15	12 13 14 15	15	15	15	15	15	220	214																
Means.		29.638	45.0	29.672	45.6	47.8	37.8	41.6	40.0	41.3	39.8		0.6	0.6	7.3	7.1															
* Total Corrections for Instrumental Errors.													0.6	0.6	7.2																
† 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.	nu.	" nucleous.		
ci.-cu.	" cirro-cumulus.	n.	" nimbus.		
ci.-s.	" cirro-stratus.	r.	" rain.		
cu.	" cumulus.	h. r.	" heavy rain.		
cu.-s.	" cumulo-stratus.	c. h. r.	" continued heavy rain.		
d.	" dew.	s.	" stratus.		
f.	" fog.	sc.	" squall.		
fr.	" frost.	s.	" sleet.		
h.-fr.	" hoar-frost.	s.	" snow.		
h.	" haze.	so. ha.	" solar halo.		
h. d.	" heavy dew.	sq.	" squall.		
l.	" hail.	sqs.	" squalls.		
l.	" lightning.	t. s.	" thunder-storm.		
li. cl.	" light clouds.	w.	" wind.		
li. sh.	" light showers.	g.	" gale of wind.		
lu. co.	" lunar corona.				
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 $\frac{1}{100}$ for Temp. (Col. 2), = 29.688 0.044 = 29.644

"Corrected Mean" of Barometer at 9 P.M., minus the Correction $\frac{1}{100}$ for Temp. (Col. 4), = 29.672 0.045 = 29.627

Mean at Station, corrected, and at 32',..... = 29.636

Correction for height, 116 feet above Mean Sea-level,..... = 0.127

Mean, reduced to 32', and Sea-level,..... = 29.763

Highest Reading, corrected for Index error, on the 5 th,..... = 30.630

Lowest Do. Do., on the 11 th,..... = 28.540

Difference, or Monthly Range,..... = 2.090

S.-R. THERMOMETER, (in shade, etc.), Highest in Month, (corrected for Index Errors), on the 7 th,..... = 56.5

Lowest in Month, corrected for Index errors, on the 27 th,..... = 29.5

Difference, or Monthly Range,..... = 29.0

"Corrected Mean" of all the Highest, (Col. 5),..... = 47.8

"Corrected Mean" of all the Lowest, (Col. 6),..... = 37.8

Difference, or Mean Daily Range,..... = 10.0

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

S.-R. THERMOMETER, Black Bulb in Sun, Highest, (corrected for Index Errors), on the 7 th,..... =

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

Lowest at Night, Black Bulb (corrected for Index errors), on the 11 th,..... =

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

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

HYGROMETER, Mean (corrected) A.M. and P.M. Reading of Dry Bulb, (Cols. 9 and 11),..... = 41.4

Mean (corrected) A.M. and P.M. Reading of Wet Bulb, (Cols. 10 and 12),..... = 39.9

Computed Temperature of Dew-Point,..... = 38.0

Do. Elastic Force of Vapour,..... = 0.230

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

Relative Humidity (Saturation = 100),..... = 89

RAIN fell on 19 Days; Amount in Inches,..... = 4.61

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	4	4	3	4	5	2	3	45		
P.M.	0	2	5	0	5	3	4	1	10		
Mean.	0	3	5	1	5	4	3	2	7	0.6	0.36

Observations made and
Return verified by

James May

(Signed)

James May

W.S.S.

SCOTTISH METEOROLOGICAL SOCIETY.

Observations taken at *Barone Cottage, Rathedney, Co. Dub.*, in Lat. *53° 49' 50"* Long *5° 4' 5"*, Distance from Sea *40* miles.
Height of Cistern of the Barometer above Mean Sea-Level *116* feet, above Ground *3* feet. During the MONTH of *December* 188*9*.

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.	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, on Sunray, at 9 P.M.		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.			9 h. A.M.		P.M.						9 h. A.M.		P.M.																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																						
		Barometer.	Attached Thermometer.	Barometer.	Attached Thermometer.	Max.	Min.	Max.	Min.	Dry bulb.	Wet bulb.	Dry bulb.	Wet bulb.		No.	Force.	Direction.	Force.	9 h. A.M.	Velocity (0-6)	Amount (0-10), and Species.	Direction.		Amount (0-6)	and Species.	No.	3 inches.	No.				12 inches.	No.	22 inches.	Temperature of WELL at depth of feet, No.	Temperature at 1 foot, and Depth.	9 A.M.	2 P.M.																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																		
		* No.	inches.	°	inches.	°	°	°	°	°	°	°	°	No.	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°		°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°

BAROMETER, "corrected Mean" at 9 A.M., minus the Correction $\frac{1}{10}$ for Temp. (Col. 2), = *29.639*..... = *29.601*
"Corrected Mean" of Barometer at 9 P.M., minus the Correction $\frac{1}{10}$ for Temp. (Col. 4), = *29.622*..... = *29.582*
Mean at Station, corrected, and at 32', = *29.592*
Correction for height, *116* feet above Mean Sea-level, = *1.27*
Mean, reduced to 32', and Sea-level, = *29.719*
Highest Reading, corrected for Index error, on the *21* th, = *30.490*
Lowest Do. Do., on the *10* th, = *28.520*
Difference, or Monthly Range, = *1.970*

S.-R. THERMOMETER, (in shade, etc.), Highest in Month, (corrected for Index Errors), on the *3* th, = *58.5*
Lowest in Month, corrected for Index errors, on the *22* th, = *30.5*
Difference, or Monthly Range, = *28.0*
"Corrected Mean" of all the Highest, (Col. 5), = *46.4*
"Corrected Mean" of all the Lowest, (Col. 6), = *36.6*
Difference, or Mean Daily Range, = *9.8*
* Calculated Mean Temperature of Month, = *41.5*

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.

