

All our Instruments are by Repetitive Gauge of 11 Water Garden, London & have been compared by W. Glaisher with Standards. They are all nearly new. The Barometer has an adjusting screw. - Our elevation above sea level was ascertained by D. Smith, and the Sappers & Miners.

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SCOTTISH METEOROLOGICAL SOCIETY.

Observations taken at Chasmas, County of Aberdeen, in Lat. 57° N., Long. 3° 24' W., Height above Sea 1110 feet.
Distance from Sea 57 miles. During the MONTH of January 1859.

Days of Month.	BAROMETER.				SELF-REGISTERING THERMOMETERS.				HYGROMETER.				WIND.				RAIN.		CLOUD.	SUNSHINE.	THERMOMETERS. under Ground.			SEA.		OZONE.	ELECTRICITY.	GENERAL REMARKS. As to occurrence of Thunder, Lightning, Storms, Hail, Meteors, Remarkable Depression or Elevation of Barometer, etc. Mention the hour at which these began and ended.	Days of Month.																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																							
	9 ^h A.M.		9 ^h P.M.		PROTECTED.		EXPOSED.		9 ^h A.M.		9 ^h P.M.		9 ^h A.M.		9 ^h P.M.		Days on which it fell.	Amount.			h. A.M.			Temperature.	Density.					0 to 10																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																						
	Barometer.	Attached Thermometer.	Barometer.	Attached Thermometer.	Highest in Air.	Lowest in Air.	Max. Black bulb in Sun.	Min. Black bulb during Night.	Dry bulb.	Wet bulb.	Dry bulb.	Wet bulb.	Direction.	Force.	Direction.	Force.					3 inches.	12 inches.	22 inches.																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																													
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1	28.86		29.06		47.0	39.2	44.0	37.0	40.9	38.8	39.7	37.2	S.W.	1	S.W.	1.5	0																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																			

Barometer, mean corrected reading of Column No. 1 (A.M.),.....= 28.273 597
Diameter of tube 0.4 inch; correction for capillarity to be added,....+ 0.07
Sum,.....= 28.280 604
Correction for Temperature from Column No. 3 to be deducted,.....= 0.016
Sum,.....= 28.264
Mean of the above.....= 28.260 28.264
Correction for Height above Sea-level, 1110 feet, to add,.....= 1.250 1.250
Barometer corrected and reduced to 32° and Sea-level,.....= 29.510 29.514

Column No. 3 (P.M.),.....= 28.268 591
Capillarity,.....= + 0.07
Sum,.....= 28.275 598
Temp. from Col. 1,.....= 19
Sum,.....= 28.256
Barometer, Highest observed reading of Month,.....= 29.41 on the 8th
Lowest do. do.,.....= 27.53 on the 29th
Difference, or Monthly Range,.....= 1.88

SUMMARY OF THE WINDS.											
Direction.	N	NE	E	SE	S	SW	W	NW	Calm or Variable.	Mean Force.	Mean Velocity in miles per day.
A.M.	1	-	1	1	5	22	1	-	1	1.89	
P.M.	-	2	-	1	1	25	1	1	1	1.81	
Mean.	0	1	1	1	3	23	1	1		1.85 mean	per day

Dry bulb Thermometer (mean of Cols. 9 and 11),.....= 36.4
Wet bulb Thermometer (mean of Cols. 10 and 12),.....= 34.7
† Dew-point Temperature,.....= 32.2
† Elastic Force of Vapour,.....= 184
† Weight of Vapour in a Cubic Foot of Air,.....
† Additional Weight required to Saturate a Cubic Foot,.....
† Degree of Humidity (Saturation 100),.....= 86

Highest Reading Self-Registering Thermometer in Air and Protected,.....= 48.8 on the 18th
Lowest do. do. do.,.....= 17.1 on the 14th
Difference, being Monthly Range,.....= 31.7
Mean of Self-Registering Thermometers in Air and Protected,.....= 36.6
Mean Daily Range in Air and Protected,.....= 9.9
Greatest Daily Range, do.,.....
Highest Reading Self-Registering Black Bulb Thermometer in Sun,.....= 63° on the 4
Lowest do. do. from Radiation during Night,.....= 15.2 on the 14

(Signed) James Cameron M.P.
(Designation) John Pearce

N.B.—This Schedule should be returned (post-paid) as early as possible after the completion of the Month, with the Sums correctly added, and the Means deduced. No Wax or Wafers ever to be employed in closing the Schedule—the Gummed Corner to be alone used.

1859
JANUARY 1859
S M
EDINBURGH
FE 3
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JANUARY 1859

Braemar
January

To
Mr. J. D. S. S. S.
DR. STARK,
10 St. Andrew Square
Sec., Meteorological Society,
Edinburgh
21, Rutland Street,
EDINBURGH

METEOROLOGICAL RETURNS.

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

SHRUBS, ETC.	FRUITS.	MIGRATORY BIRDS.	First Appearance.	First Departure.
Barberry,	Apple,	Cuckoo,		
Bourtree or Elder,	Black Currant,	Curlew,		
Broom,	Cherry,	House-Swallow,		
Hazel,	Corn,	Lapwing,		
Hawthorn,	Gooseberry,	Plover,		
Holly,	Peach,	Sand-Martin,		
Laburnum,	Pear,	Starling,		
Lilac,	Plum,	Swan,		
Mountain Ash or Rowan,	Strawberry,	Rail or Corn Crane,		
Red Flowering Currant,		Other Birds, naming them—		
Rhododendron Ponticum,				
Whin,				

FOREST TREES.	Plow.	Leaf buds.	In Leaf.	Divested of Leaves.	CROPS.	Seeding or sowing.	Planting.	Above Ground.	In Ear.	First Cut.
Alder,					Barley,					
Aspen,					Bare or Dig,					
Beech,					Oats,					
Birch,					Wheat,					
Elm,					Beans,					
Larch,					Potatoes,					
Lime,					Turnips,					
Oak,					Rye Grass,					
Sycamore or Plane,										

OBSERVATIONS IN CONNECTION WITH THE PERIODICAL RETURN OF THE SEASONS.

INSTRUCTIONS FOR MAKING METEOROLOGICAL OBSERVATIONS.

Those persons who kindly furnish Monthly Tables of the Weather to the Scottish Meteorological Society are requested to attend to the following Instructions, seeing that one of the most important ends of Meteorological Observations is their being comparable with one another; and for this purpose it is requisite that all should, if possible, observe at a like hour, and in a like manner, and have their instruments placed, in so far as circumstances allow, in a like position.

Hour of Observation.—All instruments which are observed twice a day, should be read at the same hour morning and evening, in order to furnish mean results. The Society recommends a quarter before nine o'clock morning and evening, as the most convenient hour; but should this be inconvenient for the observer, another hour may be chosen, attending, however, to the above rule, that the evening and morning readings be taken at the same hour, and this hour entered on the Schedule.

Barometer.—Barometers of Messrs. Adie and Son's construction are recommended; but any instruments may be used which have adjustable surfaces, and have been compared. Before this instrument is suspended for use it should be examined, in order to ascertain whether the space above the mercury is free from air. This is done by inclining the instrument somewhat from the vertical position, when, if free from air, the mercury will settle against the upper end of the tube with a sharp tap. The mercury should then completely fill the tube. If any air has got admittance, it should be driven into the cistern by reversing the instrument, and tapping it gently with the hand. If it cannot be thus expelled, the instrument is useless and must be replaced.

The barometer should be hung in a good light, and perfectly perpendicular, as ascertained by the plumb line; and it ought always to be gently tapped before taking the reading to prevent adhesion of the mercury to the tube. In reading the eye ought to be placed on the exact level of the top of the column of mercury. The reading of the attached thermometer ought always to be the first taken, as the heat of the breath, or the proximity of the person, are apt to influence its readings.

The corrections necessary to be applied to the Barometric readings depend on the form of the instrument. The mode of making these corrections, and the tables employed for the purpose, will be found in the "Report of the Committee of the Royal Society on Physics and Meteorology," 1840, price 1s. The daily readings of the Barometer ought to be entered on the Schedule as read off, and the corrections only applied to the mean for the month.

Self-Registering Thermometers and Hygrometers.—These should be placed alongside of each other, in a place freely exposed to the air, but protected from sunshine, and from reflected heat, as well as from radiation and from rain, and as near as may be four feet from the general surface of the ground. Different contrivances are used for this purpose, either a double ventilated box with lower-boarded sides, fixed at a north window, and projecting 12 inches from the wall, so as to allow a free current of air to pass between the box and the wall; or in a double neat-sate ventilated box with lower-boarded sides, fixed in an exposed place, and if possible over grass. Whatever means are finally decided on, the position of the instrument should be mentioned, and should not be changed (without due notice being given to the Secretary), in order that the results of one month's observations may be strictly comparable with those of another.

The *Self-Registering Thermometers* should be placed exactly horizontal. In the case of the ordinary *maximum* thermometers, with clay, glass, or steel index, the bulb may be very slightly elevated, in order that the mercurial column may be somewhat aided by the force of gravity in pushing forward the float or index; and in the case of the *minimum* thermometer, the bulb must be slightly depressed to prevent a draining of the spirit to the top of the tube, and also that any part raised in vapour may return to the column. These thermometers, if read once a-day, should always be read on the evening, so that the temperatures marked by the floats indicate the minimum and the maximum of the day on which the reading is taken. N.B.—The readings of these instruments are taken from that extremity of the float which is nearest the head of the column of mercury or of spirit.

The *maximum* Registering Thermometer, for taking the extreme heat of the sun's rays, should have its bulb blackened, and the surface rendered dull, and be so high as to project in a blackened box, whose sides should be so high as to protect the bulb from wind. It should be so placed that the sun's rays have free access to it during the heat of the day.

The *minimum* Registering Thermometer, for ascertaining the lowest temperature during the night from radiation, should have its bulb similarly blackened and rendered dull, and be similarly mounted. It should be laid out, about sunset, over grass, in a place freely exposed to the sky, but raised on wooden supports a few inches above the surface, and removed during the day.

Hygrometer.—The wet bulb requires the muslin covering it to be often changed. In towns once a month, or oftener, if the weather is dusty, and the muslin gets foul; in the country always be thoroughly wetted, and freed from starch, before being used; and the cotton wick which conducts moisture to it should be thoroughly wetted, else it will conduct the moisture imperfectly, and yield false results. The cotton wick is best attached by passing its extremity through an aperture in the centre of the muslin, spreading that portion out so as to apply evenly round the bulb, and then tying the muslin over the wet bulb. In frosty weather, water must be poured over the wet bulb, so as to form a thin film of ice on the muslin, the evaporation from the ice going on as from the simply wetted bulb.

Rain Gauge.—As "Fleming's Rain Gauge" seem to possess several advantages over others, the Society gives the preference to them; but whatever form be employed, in order that all the stations may yield comparable results, it is recommended that the Gauge be sunk in the ground, so that the top of the receiver is nearly on a level with the top blades of close cut grass, in a place as distant as possible from trees, houses, high walls, and irregular or broken ground, and the quantity of Rain, should, if possible, be registered daily. When more than one Rain Gauge is kept, they ought to be placed near each other, but at different heights above the ground, and their indications noted in the general remarks, mentioning their height above ground—the regular column in the Schedule being reserved for the ground Rain Gauge alone.

Isolated Wind-vanes or Weather-cocks are apt to give false indications of the general direction of the wind, in consequence of the currents of air at the surface of the ground being so much influenced by the neighbourhood of hills, valleys, buildings, etc. Where low clouds are seen drifting along, their direction in reference to known objects, or as noted by means of a mirror on which a compass may be laid, or by means of a circular mirror fixed over the centre of a pocket compass, will, in general, give the true direction of the current of air near the earth's surface if these clouds are near and immediately over head, that is, in or near the zenith of the observer. The notion of the higher strata of clouds gives no such indication. Failing the clouds, the general direction of the smoke of a hearth or village, or of a tall chimney, gives a better indication of the general direction of the wind than any wind-vane. The observer should state whether he has ascertained the direction by reflection or otherwise. For mode of estimating the force of the wind, see "Directions for Reading Instruments." Lind's Anemometer is commonly used for this purpose, but the best Anemometer of moderate price yet invented is Professor Robinson's Cup Wind Gauge, which registers the velocity of the wind—540 revolutions of the cups, as registered by the instrument, being equal to one statute mile.

Clouds.—The Society recommends observers to adopt the Howard nomenclature of clouds. The scale of cloud in the visible sky is reckoned from 0 to 10. Thus, a sky quite free from cloud is 0; a sky half covered with cloud is 5; and the whole visible sky covered with cloud is 10. Clouds often cover three-fourths or even more of the visible sky without obstructing the sunshining, so that the indications noted in the column for clouds would not necessarily express, or agree with, the column for sunshining. As the full moon, so long as it is above the horizon, is thought by some eminent astronomers to have a powerful effect in dispersing clouds, it would be well to note in the General Remarks any facts bearing on this point, for a few days (or nights, as the case may be) before and after every full moon; and the same observations ought to be made at the periods of new moon.

Sunshine.—The number of hours the sun shines during the day should be entered in the proper column.

Thermometers under Ground.—Though the temperature and hygrometric conditions of the air are those which chiefly influence the growth of crops, it is important for the benefit of the crop, and for the germination of the seed, that the soil itself should have a certain temperature. To collect facts which may illustrate this, it is recommended to have Thermometers sunk 3, 12, and 22 inches below the surface of the ground, to ascertain the temperature of what may be termed the agricultural soil; and the observer should enter in the Schedule the kind of soil; whether drained or undrained; and whether naturally wet or dry.

Temperature of the Sea.—As the meteorology of the island is incomplete without a knowledge of the mean temperature of the Ocean which surrounds it, the Society strongly recommends taking the temperature of the Sea at a depth of 6 feet or 1 fathom from the end of all piers or rocks round the coast, where free from the influence of river water, and as near as may be about the time of high water. A thermometer, with its bulb fixed in a small tin pichley, covered with a sloping lid, and with a weight attached, is sunk to the required depth, and in ten minutes drawn up and read. The density of the sea water should, if possible, be taken at the same time. Convenient instruments are furnished by Messrs Adie and Son.

Temperature of Springs.—The temperature of Springs or Deep Wells is recommended to be taken whenever practicable, mentioning whether Spring or Well, and its depth from the surface. Messrs. Adie and Son's, Removable Depression or Elevation of Barometer, Removable Falls of Rain, Hail or Snow, Thunder and Lightning, etc., should be specially noticed, together with the exact hour at which they were first seen, their continuance, and direction.

Budding, Leafing, and Flowering of Trees.—It is necessary to bear in mind that varieties of the same species of tree differ widely in their times of budding and flowering. *Individual Trees or Shrubs* of each kind should therefore be chosen (if possible early kinds), and their indications should be alone noted—always the same plant from year to year being noticed.

Ozone.—Mention whether Schönbein's or Mofat's scale and papers are used. Schönbein's is preferred. They may be had at Messrs Adie and Son's, 50, Princes Street, Edinburgh.

Electricity.—Pith balls suspended by a linen thread, in connection with a metallic conductivity, and under cover, and the degrees of a circle being used to express the degree of repulsion, form a cheap and convenient Electrometer. Excited glass or sealing-wax ascertains the nature of the electricity.

SCOTTISH METEOROLOGICAL SOCIETY.

Observations taken at Maunabo, County of Shelburne, in Lat. 57° 41', Long. 3° 24' W, Height above Sea 1110 feet.
Distance from Sea 57 miles. During the MONTH of February 1859.

Days of Month.	BAROMETER.				SELF-REGISTERING THERMOMETERS.				HYGROMETER.				WIND.				RAIN.		CLOUD. 10 to 100.	SUNSHINE. Hours.	THERMOMETERS under Ground.			SEA.		ELECTRICITY.	GENERAL REMARKS. As to occurrence of Thunder, Lightning, Storms, Hail, Meteors, Remarkable Depression or Elevation of Barometer, etc. Mention the hour at which these began and ended.	Days of Month.			
	9 ^h A.M.		9 ^h P.M.		PROTECTED.		EXPOSED.		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.	Highest in Air.	Lowest in Air.	Max. Black bulb in Sun.	Min. Black bulb during Night.	Dry bulb.	Wet bulb.	Dry bulb.	Wet bulb.	Direction.	Force.	Direction.	Force.	Days on which it fell.	Amount.			3 inches.	12 inches.	22 inches.	Temperature of Spring or Well.	Temperature.				Density.		
	inches.		inches.																												
1	28.47		28.01		36.7	30.1	43.0	25.7	29.3	28.0	32.0	30.8	N.W.	1.5	S.W.	4		10.0													
2	27.87		28.46		36.5	27.9	36.5	27.5	34.1	32.0	27.9	26.7	N.W.	6	N.W.	1		0.09													
3	28.72		28.67		33.0	26.9	41.8	26.0	28.3	26.1	32.8	31.4	S.W.	1	N.W.	3		0.02													
4	28.30		28.04		43.0	33.0	43.0	31.5	40.1	38.6	35.3	33.1	S.W.	3	S.W.	3		0.12													
5	27.98		28.10		37.8	34.2	43.4	32.5	35.0	33.8	34.2	33.1	S.W.	1	S.W.	2		0													
6	28.00		27.92		35.2	31.8	35.2	28.5	33.0	32.0	31.8	31.6	S.W.	0	N.E.	1		0.01													
7	27.94		28.00		32.0	23.3	32.0	23.3	28.0	27.8	23.3	23.0	S.W.	0	S.W.	0		0.01													
8	28.15		28.17		35.5	11.0	42.9	11.0	15.0	14.8	33.9	33.0	S.	0.2	S.	0		0.21													
9	27.88		27.88		39.3	33.9	39.3	32.2	36.5	35.9	39.0	37.8	S.	1	S.E.	2		0.26													
10	27.96		27.98		37.8	34.3	39.8	32.5	34.4	33.3	37.6	36.2	S.W.	2	S.W.	2		0.50													
11	28.06		28.20		40.6	35.7	46.2	33.7	35.8	35.1	37.9	36.9	S.W.	0.2	S.	1.5		0.04													
12	28.40		28.56		45.3	34.9	62.1	32.5	35.0	34.9	35.9	35.4	S.W.	0	S.W.	0		0.09													
13	28.60		28.60		42.3	34.2	49.8	31.5	38.0	36.0	38.3	37.0	S.W.	1	S.W.	0.2		0.02													
14	28.46		28.61		39.8	32.4	46.1	29.8	34.0	33.0	34.1	31.1	S.W.	1	S.	0		0													
15	28.31		28.36		47.6	33.1	50.3	30.7	44.2	43.2	44.2	40.1	S.W.	3	S.W.	1.5		0.18													
16	28.29		28.44		47.9	38.9	49.0	37.0	40.1	39.9	39.8	38.0	S.W.	1	S.W.	0		0.09													
17	28.46		28.44		43.2	32.1	48.0	28.2	37.0	36.0	37.1	31.0	S.W.	1.5	S.W.	1		0.30													
18	28.71		28.96		35.1	29.2	41.6	26.8	29.5	28.5	36.0	31.8	S.	1.5	S.W.	4		0.26													
19	28.96		28.91		42.7	32.6	42.7	26.7	33.8	31.5	42.0	40.2	S.	0.5	S.W.	0.5		0.21													
20	28.90		28.80		47.4	39.3	58.5	35.8	41.3	39.2	43.7	40.2	S.W.	1.5	S.W.	1		0.04													
21	28.73		28.80		46.6	41.0	56.5	39.0	42.3	39.8	44.2	39.7	S.W.	1	S.W.	5		0													
22	28.75		29.06		42.4	34.2	43.3	31.5	36.6	35.3	35.0	32.0	S.W.	4	S.W.	1		0.01													
23	29.19		29.00		43.8	35.0	55.0	31.6	37.0	35.2	43.4	41.0	S.W.	4	S.W.	1		0.04													
24	28.49		28.88		51.2	42.0	55.5	40.5	44.9	43.3	42.2	40.0	S.W.	3	S.W.	4		0.10													
25	28.32		28.68		47.3	41.7	48.1	40.7	44.4	41.7	44.8	42.7	S.W.	1.5	S.W.	4		0.02													
26	28.55		28.26		45.8	37.2	57.3	33.2	42.8	40.1	37.2	34.2	S.W.	1	S.W.	1		0													
27	28.64		28.94		48.9	36.0	56.8	29.7	38.5	34.8	35.3	33.8	S.	1	S.W.	5		0													
28	28.84		28.57		44.0	29.8	47.0	25.2	34.0	36.7	41.4	39.9	S.W.	3	S.W.	0.2		0													
29																															
30																															
31																															
Sums.	796.79		797.30		11707	9257	13047	8548	10079	9675	10262	9817	47.4		57.9	22	2.63	187.5													
Means.	28.456		28.475		41.8	33.0	46.9	30.5	35.9	34.5	36.6	35.0	1.69		1.85		6.6														
Index Error.	-0.009		-0.009		-	+1	+2	-1	-	-1	-	-1																			
Correction for Diurnal Range.	-0.008		-0.008		-0.4				+7	+7	+10	+5					+2														
Corrected Means.	28.439		28.458		41.8	33.1	47.1	30.4	36.6	35.1	37.6	35.4	1.69		1.85		2.63	6.8													
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				

Barometer, mean corrected reading of Column No. 1 (A.M.),.....= 28.439

Column No. 3 (P.M.),.....= 28.458

Barometer, mean corrected reading of Column No. 1 (A.M.),.....= 28.439
Diameter of tube 0.4 inch; correction for capillarity to be added,.....+ 0.007
Sum,.....= 28.446
Correction for Temperature from Column No. 9 to be deducted,.....- 0.007
Sum,.....= 28.439
Mean of the above.....= 28.435
Correction for Height above Sea-level, 1110 feet, to add,.....+ 1.250
Barometer corrected and reduced to 32° and Sea-level,.....= 29.685
Dry bulb Thermometer (mean of Cols. 9 and 11),*.....= 37.1
Wet bulb Thermometer (mean of Cols. 10 and 12),*.....= 35.2
† Dew-point Temperature,.....= 32.6
† Elastic Force of Vapour,.....= 1.85

Column No. 3 (P.M.),.....= 28.458
Capillarity,.....+ 0.007
Sum,.....= 28.465
Temp. from Col. 11,.....= 0.021
Sum,.....= 28.444

Barometer, Highest observed reading of Month,.....= 29.19 on the 23rd
Lowest do. do. do.,.....= 27.87 on the 2
Difference, or Monthly Range,.....= 1.320

SUMMARY OF THE WINDS.												
Direction.	N	NE	E	SE	S	SW	W	NW	Calm or Variable.	Mean Force.	Mean Velocity in miles per day.	
A.M.	—	1	1	1	8	13	2	2	5	1.85		
P.M.	2	—	—	—	5	16	3	2	3	1.69		
Mean.	1	1	0	1	6	14	3	2	4	1.77		

Highest Reading Self-Registering Thermometer in Air and Protected,.....= 51.2 on the 24
Lowest do. do. do.,.....= 11.0 on the 8
Difference, being Monthly Range,.....= 40.2
Mean of Self-Registering Thermometers in Air and Protected,.....= 37.4
Mean Daily Range in Air and Protected,.....= 8.7
Greatest Daily Range, do.,.....= 8.7
Highest Reading Self-Registering Black Bulb Thermometer in Sun,.....= 62.1 on the 12
Lowest do. do. do.,.....= 11.0 on the 8
from Radiation during Night,.....= 11.0 on the 8

(Signed) James Cameron
(Designation) The Secy

Month, with the Sums correctly added, and the Means deduced. No Wax or Wafers ever to be employed in closing the Schedule—the Gunmed Corner to be alone used.

The presence that you discovered our error in adding
our barometric columns in the Summary Table.
— instead of the Mean Adopted having been 28.260
it should have been 28.532.
Maunabo, April 25/59

February 1859

 T_G

DR STARK,

Sec., Meteorological Society,

21, Rutland Street,

EDINBU

METEOROLOGICAL RETURNS.

OBSERVATIONS IN CONNECTION WITH THE PERIODICAL RETURN OF THE SEASONS.

[illegible]

Have the goodnotes also to state any information you may be able to collect relative to the crops or certain, any, potatoes, Turnips, Rutas, etc., whether plentiful, or in perfection; whether any have suffered from blight, disease, etc. Whether Epizootic disease prevails among Cattle; and the Agricultural condition of the district generally.

INSTRUCTIONS FOR MAKING METEOROLOGICAL OBSERVATIONS

Those parts who kindly furnish Monthly Tables of the Weather to the Scottish Meteorological Society are requested to attend to the following Instructions, seeing that one of the most important aims of Meteorological Observations is their being comparable with one another; and for this purpose it is requisite that all should, if possible, observe at a like hour, and in a like manner, and have their instruments placed in so far as circumstances allow, in a like position:

Hour of Observation.—All instruments which are observed twice a day, should be read at the same hour morning and evening, in order to furnish mean results. The Society recommends a quarter before nine o'clock, morning and evening, as the most convenient hour; but should this be inconvenient for the observer, another hour may be chosen, attending, however, to the above rule, that the evening and morning readings be taken at the same hour, and this hour entered on the Schedule.

Brometer.—Brometers of Messrs Ait and Son's construction are recommended; but any instruments may be used which have adjustable surfaces, and have been compared. Before this instrument is suspended for use it should be examined in order to ascertain what the space above the mercury is free from air. This is done by inclining the instrument somewhat from the vertical position, when, if free from air, the mercury will strike against the upper end of the tube with a sharp tap. The mercury should be then completely fill the tube. If any air has got admittance, it should be driven out the osiren by reversing the instrument, and tapping it gently with the hand. If it cannot be thus expelled, the instrument is useless till repaired.

The Brometer should be hung in a good light, and perfectly perpendicular, as ascertained by the plumb line; and it ought always to be gently tapped before taking the reading, to prevent adhesion of the mercury to the tube. In reading, the eye ought to be placed on the exact level of the top of the column of mercury. The reading of the attached Thermometer ought always to be the first taken, as the heat of the breath, or the proximity of the person, are apt to influence its readings.

The corrections necessary to be applied to the Brometric readings depend on the form of the instrument. The mode of making these corrections, and the tables employed for the purpose, will be found in this "Report of the Committee of the Royal Society on Physics and Meteorology," 1849, price 1s. The daily readings of the Brometer ought to be entered on the *Scientific as read off*, and the corrections only applied to the mean for the month.

Self-Registering Thermometers and Hygrometers.—These should be placed alongside of each other, in a place freely exposed to the air but protected from sunbath, and from reflected heat, as well as from radiation and from rain, and as near as may be *four feet* from the general surface of the ground. Different contrivances are used for this purpose, either a double ventilated box with four-boarded sides, fixed at a north window, and projected 12 inches from the wall, so as to allow a free current of air to pass between the box and the wall; or in a double metal-plate ventilated box with four-boarded sides, fixed in an exposed place, and if possible over grass. Whatever means are finally decided on, the position of the instruments should be mentioned, and should not be changed, without due notice being given to the Secretary, in order that the results of one month's observations may be strictly comparable with those of another.

The *Self-Registering Thermometers* should be placed exactly horizontal. In the case of the ordinary *maximum* Thermometer, with clay glass, or steel index, the bulb may be very slightly elevated, in order that the mercurial column may be somewhat raised; and in the case of the *minimum* Thermometer, the bulb must be slightly depressed, to prevent a draining of the spirit to the top of the tube, and also that any part raised in vapour may return to the column. These Thermometers, if read once a-day, should always be read on the evening, so that the temperatures marked by the floats indicate the minimum and the maximum of the day on which the reading is taken. "N.B.—The readings of these instruments are taken from that extremity of the float which represents the *head* of the column of mercury or of spirit.

The maximum Registering Thermometer. For ascertaining the lowest temperature during the night from radiation, should have its bulb similarly blathered and rendered dull, and be similarly mounted. It should be laid out about sunrise, over grass, in a place freely exposed to the sky, but raised on wooden supports a few inches above the surface, and removed during the day.

Hygrometer.—The wet bulb requires the mesh covering it to be often changed. In towns once a month, or oftener, if the weather is dry, and the mesh gets foul; in the country the mesh should whenever the mesh seems to be foul. The mesh should always be thoroughly wetted, and freed from starch, before being used; and the cotton wick, which conducts moisture to it should be thoroughly wetted, else it will conduct the moisture inwardly, and yield false results. The cotton wick is best attracted by passing its extremity through an aperture in the centre of the mesh, spreading that portion out so as to apply, equally round the bulb, and then giving the mesh over the bulb, so as to form a thin film of ice on the mesh, the evaporation, so as to form a thin film of ice on the mesh, the evaporation from the ice going on from the simply wetted bulb.

Rain Gages.—As 'Flaming's Rain Gages' seem to possess several advantages over others, the Society gives the preference to them; but whatever form be employed, in order that all the stations may yield comparable results, it is recommended that the Gages be sunk in the ground, so that the top of the receiver is nearly on a level with the top blades of *grass* or *grass* in a place distant as possible from trees, houses, high walls, and irregular or broken ground, and the *quantity of Rain* should, if possible, be *registered daily*. When more than one Rain Gage is kept, they ought to be placed near each other, but at different heights above the ground, and their indications noted in the *general column*, mentioning their height above ground—the regular column in the Schedule being reserved for the ground Rain Gage alone.

Winds.—Isolated Wind-vanes or Weather-cocks are apt to give false indications of the general direction of the wind, in consequence of the currents of air at the surface of the ground being so much influenced by the neighbourhood of hills, valleys, hills, etc., etc. Where low clouds are seen drifting along their direction in reference to known objects, or as noted by means of a mirror on which a compass may be held, or by means of a circular mirror fixed over the centre of a pocket-compass, will, in general, give the true direction of the current of air near the earth's surface; if these clouds are near and immediately over head, that is, in or near the zenith of the observer. The motion of the higher strata of clouds gives no such indication. Failing the clouds, or of a tall general direction of the smoke of a hamlet or village, or of a tall chimney, gives a better indication of the general direction of the wind than any wind-vane. The observer should state whether he has ascertained the direction by reflection or otherwise. For mode of estimating the force of the wind, see 'Directions for Reading Instruments.' Lind's Anemometer is commonly used for this purpose, but the best Anemometer at moderate price yet invented is Professor Robinson's Cup Wind Gage, which registers the velocity of the wind—340 revolutions of the cups, as registered by the instrument, being equal to one statute mile.

Clouds.—The Society recommends observers to adopt the Howard nomenclature of clouds: The scale of cloud in *altitude* visible sky is reckoned from 0 to 10. Thus a sky quite free from cloud is 0; a sky half covered with cloud is 5; and the whole visible sky covered with cloud is 10. Clouds often cover three-fourths or even more of the visible sky without obstructing the sunshining, so that the indications noted in the column for clouds would not necessarily express, or agree with, the column for sunshining. As the full moon, so long as it is above the horizon, is thought by some eminent astronomers to have a powerful effect in clearing the sky, it would be well to note in the General Remarks disjunctive clouds; it would be well, for a few days (or nights, as your facts bearing on this point, for a few days (or nights, as your facts bear) before and after every full moon; and the same observations ought to be made at the periods of new moon.

Sunshine.—The number of hours the sun shines during the day should be entered in the proper column.

Thermometers under Ground.—Though the temperature and hygrometric conditions of the air are those which chiefly influence the growth of crops, it is important for the health of the crop, and for the germination of the seed, that the soil itself should be at a certain temperature. To collect facts which may illustrate this, it is recommended to have *Thermometers* sunk 9, 12, and 22 inches below the surface of the ground, to ascertain the temperature of what may be termed the *agricultural soil*; and the observer should enter in the Schedule the *kind of soil*; whether *drained* or *undrained*; and whether *naturally new* or *dry*.

Temperature of the Sea.—As the meteorology of the island is incomplete without a knowledge of the mean temperature of the Ocean which surrounds it, the Society strongly recommends taking the temperature of the Sea at a depth of 6 feet or 1 fathom from the end of all piers or rocks round the coast, where free from the influence of river water, and as near as may be above the time of high water. A thermometer, with its bulb fixed in a small tin pail, covered with a sloping lid, and with a weight attached, is suitable to overlearn depth, and is ten minutes drawn up and read. The density of the sea water should, if possible, be taken at the same time. Convenient instruments are furnished by Messrs Adair and Son.

Temperature of Springs.—The temperature of Springs or Deep Wells is recommended to be taken whenever practicable, noting whether Spring or Well, and its depth from the surface.

Minors, Aurora Borealis, Remarkable Deposition or Evaporation of Bromine, Remarkable Falls of Rain, Hail or Snow, Thunder and Lightning, etc., should be specially noticed, together with the exact hour at which they were first seen, their continuance, and direction.

Fading, Lighting, and Flowering of Trees.—It is necessary to be in mind that varieties of the same species of tree differ widely in their times of fading and flowering. *Individual Trees* or *Shrubs* of each kind should therefore be chosen (if possible early or kinds) and their indications should be alone noted—always the same plant from year to year being noticed.

Gauges.—Mention whether Schenck's or Motat's scale and papers are used. Schenck's are preferred. They may be had at Messrs A. & S. 50, Princes Street, and at Mr. Byles's, 60, The Strand, Edinburgh.

Electricity.—Fish balls suspended by a linen thread, in connection with a metallic contrivance, and under cover, and the degree of an article being used to express the degree of repetition, form a cheap and convenient Electrometer. Existed goss or sealing wax ascertains the nature of the electricity.

MARCH 1859

16 Mr. J. D. Everett,
Sec^y. Meteorological Society,
10 St. Andrew Square,
Edinburgh.

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

[illegible]

OBSERVATIONS IN CONNECTION WITH THE PERIODICAL RETURN OF THE SEASONS.

INSTRUCTIONS FOR MAKING METEOROLOGICAL OBSERVATIONS.

Those persons who kindly furnish Monthly Talents of the Weather to the Scottish Meteorological Society are requested to attend to the following Instructions, seeing that one of the most important ends of Meteorological Observations is their being comparable with one another; and for this purpose it is requisite that all should, if possible, observe at a like hour, and in a like manner, and have their instruments placed, in so far as circumstances allow, in a like position:—

circumstances allow, in the last position:

Hour of Observation.—All instruments which are observed twice a day should be read at the same hour morning and evening, in order to furnish mean results. The Society recommends a *quarter before nine o'clock morning and evening*, as the most convenient hour; but should this be inconvenient for the observer, another hour may be chosen, attending, however, to the above rule, that the evening and morning readings be taken at the same hour, and the time entered on the Schedule.

Remarks.—Parameters of M'Sars, Aidi and Son's construction

at the same hour, and thus both altered on the scheme.

Barometer.—Barometers of Messrs. Adams and Son's construction are recommended; but any instruments may be used which have adjustable surfaces; and but few are necessary. Before this instrument is suspended for use it should be examined, in order to ascertain whether the space above the mercury is free from air. This is done by inclining the instrument somewhat from the vertical position, when, if free from air, the mercury will strike against the upper end of the tube with a sharp tap. The mercury should then completely fill the tube. If any air has got admittance, it should be driven into the cistern by reversing the instrument, and tapping it gently with the hand. If it cannot be thus expelled, the instrument is useless and left repaired.

The Barometer should be hung in a good light, and perfectly

The barometer should be hung in a good light, and perfectly perpendicularly, as ascertained by the plumb line; and it ought always to be gently tapped before taking the reading to prevent adhesion of the mercury to the tube. In reading the column of mercury, the reading of the top of the column of mercury should be placed on the exact level of the top of the column of mercury. The reading of the attached thermometer ought always to be the first taken, as the heat of the breath, or the proximity of the person, are apt to influence its readings. The corrections necessary to be applied to the barometric reading are given in the accompanying table.

The corrections necessary to be applied to the Barometric readings depend on the form of the instrument. The mode of making these corrections, and the tables employed for the purpose, will be found in the "Report of the Committee of the Royal Society on Physics and Meteorology," 1840, p. 131. The daily readings of the Barometer ought to be entered on the Schedule as *read off*, and the corrections only applied to the mean for the month. *Self-registering Thermometers and Hygrometers*.—These should be placed alongside of each other, in a place freely exposed to the air, but protected from sunbaking and from reflected rays, as well as from radiation and from rain, and as near as may be *found* from the general surface of the ground. Different contrivances are used for this purpose, either a double ventilated box with louver-boarded sides, fixed at a north window, and projected 12 inches from the wall, so as to allow a free current of air to pass between the box and the wall; or in a double mercurial ventilated box with louver-boarded sides, fixed in an exposed place, and if possible over glass. Whatever means are adopted, decided on, the position of the instruments should be mentioned, and should not be changed (without due notice being given to the Secretary), in order that the results of one month's observations may be strictly comparable with those of another. Self-registering

may be readily comparable with those of another. The *S&P*-*Righting* *Thermometers* should be placed exactly horizontal. In the case of the ordinary *maximum* *Thermometer*, with clay glass, or steel index, the bulb may be very slightly elevated, in order that the mercurial column may be somewhat aided by the force of gravity in pushing forward the float or index; and in the case of the *minimum* *Thermometer*, the bulb must be slightly depressed, to prevent a draining of the spirit to the top of the tube, and also that any part raised in vapour may return to the column; These *Thermometers*, if read once a-day, should *always be read on the outside*, so that the temperatures marked by the floats indicate the minimum and the maximum of the day on which the reading is taken. N.B.—The readings of these instruments are taken from that extremity of the float which is nearest the *head* of the column of mercury or of spirit.

The *maximum* Registering Thermometer, for taking the exactest *read* of the column of mercury or of spirit.

The surface of the sun's rays, should have its bulb blackened and the surface rendered dull, and it should be mounted in a blackened box, whose sides should be so high as to protect the bulb from wind. It should be so placed that the sun's rays have free access to it during the heat of the day.

The *minimum* Registering Thermometer, for ascertaining the

access to it during the heat of the day." The *minimum* Registering Thermometer, for ascertaining the lowest temperature during the night from radiation, should have its bulb similarly blackened and rendered dry, and be similarly mounted. It should be laid out, about sunset, over grass, in a place freely exposed to the sky, but raised on wooden supports a few inches above the surface, and removed during the day.

Humidity.—The wet bulb requires the muslin covering it to

Hypomnestes—the wet bulb requires the muslin covering it to be often changed. In towns over a month, or if the country weather is dry, and the muslin gets foul, in the country wherever the muslin seems to be foul, the muslin should always be thoroughly wetted, and freed from starch, before being used; and the cotton wick which conducts moisture to it should be thoroughly wetted, else it will conduct the moisture imperfectly, and yield false results. The cotton wick is best attached by passing its extremity through an aperture in the centre of the muslin, spreading that portion out so as to apply equally round the bulb, and then tying the muslin over the bulb. In frosty weather, water must be poured over the wet bulb, so as to form a thin film of ice on the muslin, the evaporation from the ice going on as from the simply wetted bulb.

Rain Gauge.—As a "Planning Rain Gauge" seem to possess several advantages over others, the Society gives the preference to them; but whatever form be employed, in order that all the stations may yield comparable results, it is recommended that the Gauge be sunk in the ground, so that the top of the receiver is nearly on a level with the top blades of *cleave cut grass*, in a place as distant as possible from trees, hedges, *high walls*, and irregular or broken ground, and the *quantity of Rain, should, if possible, be registered daily*. When more than one Rain Gauge is kept, they ought to be placed near each other, but at different heights above the ground, and their indications noted in the *general remarks*, mentioning their height above ground;—the regular column in the Schedule being reserved for the ground Rain Gauge alone.

Gave also—Isolated Wind-vanias or Weather-cocks are apt to give false indications of the general direction of the wind, in consequence of the currents of air at the surface of the ground being so much influenced by the neighbourhood of hills, valleys, buildings, &c. Where low clouds are seen drifting along, their direction in reference to known objects, or as noted by means of a mirror on which a compass may be laid, or by means of a circular mirror fixed over the centre of a pocket compass, will, in general, give the true direction of the current of air near the earth's surface; if these clouds are near and immediately over head, that is, in or near the zenith of the observer. The motion of the higher strata of clouds gives no such indication. Feeling the clouds, the general direction of the smoke of a bonfire, or village, or a tall chimney, gives a better indication of the general direction of the wind than any wind-vane. The observer should state whether he has ascertained the direction by reflection or otherwise. For mode of estimating the force of the wind, see *Wind-vanes*.

Instruments.—Lund's Anemometer is commonly used for this purpose, but the best Anemometer of moderate size yet improved, is Professor Robinson's Cup Wind Gauge, which registers the velocity of the wind,—340 revolutions of the cups, as registered by the instrument, being equal to one statute mile.

registered, the instrument, being equal to one sextant mile. The *Clouds*.—The Society recommends observers to adopt the Howard nomenclature of clouds. The scale of cloud in the visible sky is reckoned from 0 to 10. Thus, a sky quite free from cloud is 0; a sky half covered with cloud is 5; and the whole visible sky covered with cloud is 10. Clouds often cover three-fourths or even more of the visible sky without obstructing the sunshine, so that the indications given in the column for clouds would not necessarily express or agree with, the column for sunshine. As the full moon, so *long as it is above the horizon*, is for sunshine. By some eminent astronomers to have a powerful effect in dissipating clouds it would be well to note in the General Remarks any facts bearing on this point, for a few days (or nights), as the case may be, before and after every full moon; and the same observations ought to be made at the periods of new moon.

Sunshine.—The number of hours the sun shines during the day should be entered in the proper column.

Thermometers (under *Wind*).—Though the temperature and

day should be entered in the proper column. The temperature of the soil should be entered under *Ground*. Though the temperature and hygrometric conditions of the air are those which chiefly influence the growth of crops, it is important for the health of the crop, and for the germination of the seed, that the soil itself should have a certain temperature. To collect facts which will illustrate this, it is recommended to have *Thermometers* sunk 3, 12, and 22 inches below the surface of the ground, to ascertain the temperature of what may be termed the agricultural soil; and the observer should enter in the Schedule the *kind* of soil; whether drained or undrained; and whether naturally wet or dry.

Temperature of the Sea—As the meteorology of the island is

or immatures, and young. As the meteorology of the island is incomplete without a knowledge of the mean temperature of the Ocean which surrounds it, the Society strongly recommends taking the temperature of the Sea at a depth of 6 feet or 1 fathom from the end of all piers or rocks round the coast, where free from the influence of river water, and as near as may be about the time of high water. A thermometer, with its bulb fixed in a small tin pichet, covered with a sloping lid and with a weight attached, is sent to the appointed depth, and in ten minutes drawn up and read. The density of the sea water should, if possible, be taken at the same time. Convenient instruments are furnished by Messrs Adie and Son, *of Glasgow*. The temperature of Springs or Deep

Adie and Son. ^c ^d ^e ^f ^g ^h ⁱ ^j ^k ^l ^m ⁿ ^o ^p ^q ^r ^s ^t ^u ^v ^w ^x ^y ^z ^{aa} ^{ab} ^{ac} ^{ad} ^{ae} ^{af} ^{ag} ^{ah} ^{ai} ^{aj} ^{ak} ^{al} ^{am} ^{an} ^{ao} ^{ap} ^{aq} ^{ar} ^{as} ^{at} ^{au} ^{av} ^{aw} ^{ax} ^{ay} ^{az} ^{ba} ^{bb} ^{bc} ^{bd} ^{be} ^{bf} ^{bg} ^{bh} ^{bi} ^{bj} ^{bk} ^{bl} ^{bm} ^{bn} ^{bo} ^{bp} ^{bq} ^{br} ^{bs} ^{bt} ^{bu} ^{bv} ^{bw} ^{bx} ^{by} ^{bz} ^{ca} ^{cb} ^{cc} ^{cd} ^{ce} ^{cf} ^{cg} ^{ch} ^{ci} ^{cj} ^{ck} ^{cl} ^{cm} ^{cn} ^{co} ^{cp} ^{cq} ^{cr} ^{cs} ^{ct} ^{cu} ^{cv} ^{cw} ^{cx} ^{cy} ^{cz} ^{da} ^{db} ^{dc} ^{dd} ^{de} ^{df} ^{dg} ^{dh} ^{di} ^{dj} ^{dk} ^{dl} ^{dm} ^{dn} ^{do} ^{dp} ^{dq} ^{dr} ^{ds} ^{dt} ^{du} ^{dv} ^{dw} ^{dx} ^{dy} ^{dz} ^{ea} ^{eb} ^{ec} ^{ed} ^{ee} ^{ef} ^{eg} ^{eh} ^{ei} ^{ej} ^{ek} ^{el} ^{em} ^{en} ^{eo} ^{ep} ^{eq} ^{er} ^{es} ^{et} ^{eu} ^{ev} ^{ew} ^{ex} ^{ey} ^{ez} ^{fa} ^{fb} ^{fc} ^{fd} ^{fe} ^{ff} ^{fg} ^{fh} ^{fi} ^{fj} ^{fk} ^{fl} ^{fm} ^{fn} ^{fo} ^{fp} ^{fq} ^{fr} ^{fs} ^{ft} ^{fu} ^{fv} ^{fw} ^{fx} ^{fy} ^{fz} ^{ga} ^{gb} ^{gc} ^{gd} ^{ge} ^{gf} ^{gg} ^{gh} ^{gi} ^{gj} ^{gk} ^{gl} ^{gm} ^{gn} ^{go} ^{gp} ^{gq} ^{gr} ^{gs} ^{gt} ^{gu} ^{gv} ^{gw} ^{gx} ^{gy} ^{gz} ^{ha} ^{hb} ^{hc} ^{hd} ^{he} ^{hf} ^{hg} ^{hh} ^{hi} ^{hj} ^{hk} ^{hl} ^{hm} ^{hn} ^{ho} ^{hp} ^{hq} ^{hr} ^{hs} ^{ht} ^{hu} ^{hv} ^{hw} ^{hx} ^{hy} ^{hz} ^{ia} ^{ib} ^{ic} ^{id} ^{ie} ^{if} ^{ig} ^{ih} ⁱⁱ ^{ij} ^{ik} ^{il} ^{im} ⁱⁿ ^{io} ^{ip} ^{iq} ^{ir} ^{is} ^{it} ^{iu} ^{iv} ^{iw} ^{ix} ^{iy} ^{iz} ^{ja} ^{jb} ^{jc} ^{jd} ^{je} ^{jf} ^{jj} ^{jk} ^{jl} ^{jm} ^{jn} ^{jo} ^{jp} ^{jq} ^{jr} ^{js} ^{jt} ^{ju} ^{jv} ^{jw} ^{jx} ^{ky} ^{kz} ^{la} ^{lb} ^{lc} ^{ld} ^{le} ^{lf} ^{lg} ^{lh} ^{li} ^{lj} ^{lk} ^{ll} ^{lm} ^{ln} ^{lo} ^{lp} ^{lq} ^{lr} ^{ls} ^{lt} ^{lu} ^{lv} ^{lw} ^{lx} ^{ly} ^{lz} ^{ma} ^{mb} ^{mc} ^{md} ^{me} ^{mf} ^{mg} ^{mh} ^{mi} ^{mj} ^{mk} ^{ml} ^{mm} ^{mn} ^{mo} ^{mp} ^{mq} ^{mr} ^{ms} ^{mt} ^{mu} ^{mv} ^{mw} ^{mx} ^{my} ^{mz} ^{na} ^{nb} ^{nc} nd ^{ne} ^{nf} ^{ng} ^{nh} ⁿⁱ ^{nj} ^{nk} ^{nl} ^{nm} ⁿⁿ ^{no} ^{np} ^{nq} ^{nr} ^{ns} ^{nt} ^{nu} ^{nv} ^{nw} ^{nx} ^{ny} ^{nz} ^{oa} ^{ob} ^{oc} ^{od} ^{oe} ^{of} ^{og} ^{oh} ^{oi} ^{oj} ^{ok} ^{ol} ^{om} ^{on} ^{oo} ^{op} ^{oq} ^{or} ^{os} ^{ot} ^{ou} ^{ov} ^{ow} ^{ox} ^{oy} ^{oz} ^{pa} ^{pb} ^{pc} ^{pd} ^{pe} ^{pf} ^{pg} ^{ph} ^{pi} ^{pj} ^{pk} ^{pl} ^{pm} ^{pn} ^{po} ^{pp} ^{pq} ^{pr} ^{ps} ^{pt} ^{pu} ^{pv} ^{pw} ^{px} ^{py} ^{pz} ^{qa} ^{qb} ^{qc} ^{qd} ^{qe} ^{qf} ^{qg} ^{qh} ^{qi} ^{qj} ^{qk} ^{ql} ^{qm} ^{qn} ^{qo} ^{qp} ^{qq} ^{qr} ^{qs} ^{qt} ^{qu} ^{qv} ^{qw} ^{qx} ^{qy} ^{qz} ^{ra} ^{rb} ^{rc} rd ^{re} ^{rf} ^{rg} ^{rh} ^{ri} ^{rj} ^{rk} ^{rl} ^{rm} ^{rn} ^{ro} ^{rp} ^{rq} ^{rr} ^{rs} ^{rt} ^{ru} ^{rv} ^{rw} ^{rx} ^{ry} ^{rz} ^{sa} ^{sb} ^{sc} ^{sd} ^{se} ^{sf} ^{sg} ^{sh} ^{si} ^{sj} ^{sk} ^{sl} sm ^{sn} ^{so} ^{sp} ^{sq} ^{sr} ^{ss} st ^{su} ^{sv} ^{sw} ^{sx} ^{sy} ^{sz} ^{ta} ^{tb} ^{tc} ^{td} ^{te} ^{tf} ^{tg} th ^{ti} ^{tj} ^{tk} ^{tl} tm ^{tn} ^{to} ^{tp} ^{tq} ^{tr} ^{ts} ^{tt} ^{tu} ^{tv} ^{tw} ^{tx} ^{ty} ^{tz} ^{ua} ^{ub} ^{uc} ^{ud} ^{ue} ^{uf} ^{ug} ^{uh} ^{ui} ^{uj} ^{uk} ^{ul} ^{um} ^{un} ^{uo} ^{up} ^{uq} ^{ur} ^{us} ^{ut} ^{uu} ^{uv} ^{uw} ^{ux} ^{uy} ^{uz} ^{va} ^{vb} ^{vc} ^{vd} ^{ve} ^{vf} ^{vg} ^{vh} ^{vi} ^{vj} ^{vk} ^{vl} ^{vm} ^{vn} ^{vo} ^{vp} ^{vq} ^{vr} ^{vs} ^{vt} ^{vu} ^{vv} ^{vw} ^{vx} ^{vy} ^{vz} ^{wa} ^{wb} ^{wc} ^{wd} ^{we} ^{wf} ^{wg} ^{wh} ^{wi} ^{wj} ^{wk} ^{wl} ^{wm} ^{wn} ^{wo} ^{wp} ^{wq} ^{wr}

and divinity.

Budding, Loping, and Flowering of Trees.—It is necessary to bear in mind that varieties of the same species of tree differ widely in their times of budding and flowering. *Individual Trees or Shrubs* of each kind should therefore be chosen (if possible early kinds), and their indications should be alone noted—always the same point from year to year being noticed.

Grass.—Mention whether Schönborn's or Mökff's scale and papers are used. Schönborn's are preferred. They may be had at Messrs. Ayle and Son's, 20, Princess Street, and at Mr. Buxson's, 60, Princess Street, Edinburgh.

Electricity.—Pith balls suspended by a linen thread, in connection with a metallic conductor, and under cover, in the degrees of a circle being used to express the degree of repulsion, form a cheap and convenient Electrometer. Excited glass or sealing-wax ascertains the nature of the electricity.

INSTRUCTIONS FOR MAKING METEOROLOGICAL OBSERVATIONS.

Those persons who kindly furnish Monthly Tables of the Weather to the Scottish Meteorological Society are requested to attend to the following Instructions, seeing that one of the most important ends of Meteorological Observations is their being comparable with one another; and for this purpose it is requisite that all should, if possible, observe at a like hour, and in a like manner, and have their instruments placed, in so far as circumstances allow, in a like position:

Hour of Observation.—All instruments which are observed twice a-day, should be read at the same hour, morning and evening, in order to furnish mean results. The Society recommends a quarter before nine o'clock, morning and evening, as the most convenient hour; but should this be inconvenient for the observer, another hour may be chosen, attending, however, to the above rule, that the evening and morning readings be taken at the same hour, and this hour entered on the Schedule.

Barometer.—Barometers of Messrs. Adie and Son's construction are recommended; but any instruments may be used which have adjustable surfaces, and have been compared. Before this instrument is suspended for use it should be examined, in order to ascertain whether the space above the mercury is free from air. This is done by inclining the instrument somewhat from the vertical position, when, if free from air, the mercury will strike against the upper end of the tube with a sharp tap. The mercury should then completely fill the tube. If any air has got admittance, it should be driven into the cistern by reversing the instrument, and tapping it gently with the hand. If it cannot be thus expelled, the instrument is useless till repaired.

The Barometer should be hung in a good light, and perfectly perpendicular, as ascertained by the plumb line; and it ought always to be gently tapped before taking the readings to prevent adhesion of the mercury to the tube. In reading the eye ought to be placed on the exact level of the top of the column of mercury. The reading of the attached Thermometer ought always to be the first taken, as the heat of the breath, or the proximity of the person, are apt to influence its readings.

The corrections necessary to be applied to the Barometric readings depend on the form of the instrument. The mode of making these corrections, and the tables employed for the purpose, will be found in the "Report of the Committee of the Royal Society on Physics and Meteorology," 1840, price 1s. The daily readings of the Barometer ought to be entered on the Schedule as read off, and the corrections only applied to the mean for the month. *Self-Registering Thermometers and Hygrometers.*—These should be placed alongside of each other, in a place freely exposed to the air, but protected from sunshine, and from reflected heat, as well as from radiation and from rain, and as near as may be four feet from the general surface of the ground. Different contrivances are used for this purpose, either a double ventilated box with louver-boarded sides, fixed at a north window, and projecting 12 inches from the wall, so as to allow a free current of air to pass between the box and the wall; or in a double meat-sate ventilated box with louver-boarded sides, fixed in an exposed place, and if possible over grass. Whatever means are finally decided on, the position of the instruments should be mentioned, and should not be changed (without due notice being given to the Secretary), in order that the results of one month's observations may be strictly comparable with those of another.

The *Self-Registering Thermometers* should be placed exactly horizontal. In the case of the ordinary *maximum* Thermometer, with clay, glass, or steel index, the bulb may be very slightly elevated, in order that the mercurial column may be somewhat aided by the force of gravity in pushing forward the float or index; and in the case of the *minimum* Thermometer, the bulb must be slightly depressed, to prevent a draining of the spirit to the top of the tube, and also that any part raised in vapour may return to the column. These Thermometers, if read once a-day, should always be read on the evening, so that the temperatures marked by the floats indicate the minimum and the maximum of the day on which the reading is taken. N.B.—The readings of these instruments are taken from that extremity of the float which is nearest the head of the column of mercury or of spirit.

The *maximum* Registering Thermometer, for taking the extreme heat of the sun's rays, should have its bulb blackened and the surface rendered dull, and it should be mounted in a blackened box, whose sides should be so high as to protect the bulb from wind. It should be so placed that the sun's rays have free access to it during the heat of the day.

The *minimum* Registering Thermometer, for ascertaining the lowest temperature during the night from radiation, should have its bulb similarly blackened and rendered dull, and be similarly mounted. It should be laid out, about sunset, over grass, in a place freely exposed to the sky, but raised on wooden supports a few inches above the surface, and removed during the day.

Hygrometer.—The wet bulb requires the muslin covering it to be often changed. In towns once a month, or oftener, if the weather is dusty, and the muslin gets foul; in the country whenever the muslin seems to be foul. The muslin should always be thoroughly wetted, and freed from starch, before being used; and the cotton wick which conducts moisture to it should be thoroughly wetted, else it will conduct the moisture imperfectly, and yield false results. The cotton wick is best attached by passing its extremity through an aperture in the centre of the muslin, spreading that portion out so as to apply equally round the bulb, and then tying the muslin over the wet bulb. In frosty weather, water must be poured over the wet bulb, so as to form a thin film of ice on the muslin, the evaporation from the ice going on as from the simply wetted bulb.

Rain Gauge.—As "Fleming's Rain Gauges" seem to possess several advantages over others, the Society gives the preference to them; but whatever form be employed, in order that all the stations may yield comparable results, it is recommended that the Gauge be sunk in the ground, so that the top of the receiver is nearly on a level with the top blades of close cut grass, in a place as distant as possible from trees, houses, high walls, and inclosures or broken ground, and the quantity of Rain, should, if possible, be registered daily. When more than one Rain Gauge is kept, they ought to be placed near each other, but at different heights above the ground, and their indications noted in the regular returns, mentioning their height above ground—the regular column in the Schedule being reserved for the ground Rain Gauge alone.

Winds.—Isolated Wind-vanes or Weather-cocks are apt to give false indications of the general direction of the wind, in consequence of the currents of air at the surface of the ground being so much influenced by the neighbourhood of hills, valleys, buildings, etc. Where low clouds are seen drifting along, their direction in reference to known objects, or as noted by means of a mirror on which a compass may be laid, or by means of a circular mirror fixed over the centre of a pocket compass, will, in general, give the true direction of the current of air near the earth's surface if these clouds are near and immediately overhead, that is, in or near the zenith of the observer. The motion of the higher strata of clouds gives no such indication. Failing the clouds, the chimney gives a better indication of the general direction of the wind than any wind-vane. The observer should state whether he has ascertained the direction by reflection or otherwise. For mode of estimating the force of the wind, see "Directions for Reading Instruments." Lind's Anemometer is commonly used for this purpose, but the best Anemometer of moderate price yet invented is Professor Robinson's Cup Wind Gauge, which registers the velocity of the wind,—360 revolutions of the cups, as registered by the instrument, being equal to one statute mile.

Clouds.—The Society recommends observers to adopt the Howard nomenclature of clouds. The scale of cloud in the visible sky is reckoned from 0 to 10. Thus, a sky quite free from cloud is 0; a sky half covered with cloud is 5; and the whole visible sky covered with cloud is 10. Clouds often cover three-fourths or even more of the visible sky without obstructing the sunshine, so that the indications noted in the column for clouds would not necessarily express, or agree with, the column for sunshine. As the full moon, so long as it is above the horizon, is thought by some eminent astronomers to have a powerful effect in dispelling clouds, it would be well to note in the General Remarks any facts bearing on this point, for a few days (or nights, as the case may be) before and after every full moon; and the same observations ought to be made at the periods of new moon.

Sunshine.—The number of hours the sun shines during the day should be entered in the proper column.

Thermometers under Ground.—Though the temperature and hygrometric conditions of the air are those which chiefly influence the growth of crops, it is important for the health of the crop, and for the germination of the seed, that the soil itself should have a certain temperature. To collect facts which may illustrate this, it is recommended to have Thermometers sunk 3, 12, and 22 inches below the surface of the ground, to ascertain the temperature of whatever may be named the kind of soil; whether drained or undrained; and whether naturally wet or dry.

Temperature of the Sea.—As the meteorology of the island is incomplete without a knowledge of the mean temperature of the Ocean which surrounds it, the Society strongly recommends taking the temperature of the Sea at a depth of 6 feet or 1 fathom from the end of all piers or rocks round the coast, where free from the influence of river waters, and as near as may be about the time of high water. A Thermometer, with its bulb fixed in a small tin pincely covered with a sloping lid, and with a weight attached, is suitable to the required depth, and in ten minutes drawn up and read. The density of the sea water should, if possible, be taken at the same time. Convenient instruments are furnished by Messrs Adie and Son.

Temperature of Springs.—The temperature of Springs or Deep Wells is recommended to be taken whenever practicable, mentioning whether Spring or Well, and its depth from the surface. *Motions.* Auroral Borealis, Remarkable Depression or Elevation of Barometer, Remarkable Falls of Rain, Hail or Snow, Thunder and Lightning, etc., should be specially noticed, together with the exact hour at which they were first seen, their continuance, and direction.

Birding, Leafing, and Flowering of Trees.—It is necessary to bear in mind that varieties of the same species of tree differ widely in their times of leafing and flowering. *Indicinal* Trees or Shrubs of each kind should therefore be chosen (if possible early kinds), and their indications should be alone noted—always the same plant from year to year being noticed.

Ozone.—Mention whether Schombert's or McAffet's scale and papers are used. Schombert's are preferred. They may be had at Messrs Adie and Sons, 50, Princess Street, and at Mr Bryson's, 60, Princess Street, Edinburgh.

Electricity.—Pith balls suspended by a linen thread, in connection with a metallic conductor, and under cover, and the degree of a circle being used to express the degree of repulsion, from a cheap and convenient Electrometer. Exacted glass or sealing-wax ascertains the nature of the electricity.

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

SHRUBS, ETC.	FRUITS.	MIGRATORY BIRDS.	First Departure.	First Arrival.
First in Bloom.	First in Bloom.	First in Bloom.	First in Bloom.	First in Bloom.
Alder,	Barley,	Beet or Bigg,	Oats,	Wheat,
Asch,	Beech,	Birch,	Elm,	Larch,
Oak,	Sycamore or Plane,	Rye Grass,	Turnips,	Potatoes,
Barberry,	Apple,	Cuckoo,	Curlew,	House-Swallow,
Broom,	Cherry,	Lapwing,	Plover,	Sand-Martin,
Hazel,	Gooseberry,	Starling,	Swan,	Rail or Corn Crake,
Holly,	Peach,	Other Birds, naming them—	Strawberry,	Mountain Ash or Rowan,
Laburnum,	Plum,	Red Flowering Currant,	Rhododendron Ponticum,	Whin,

OBSERVATIONS IN CONNECTION WITH THE PERIODICAL RETURN OF THE SEASONS.

Sec., Meteorological Society,

21, Rutland Street,

EDINBURGH.

METEOROLOGICAL RETURNS.

APRIL 1859

APRIL 1859

APRIL 1859

Stark

SCOTTISH METEOROLOGICAL SOCIETY.

Observations taken at Braemar, County of Aberdeen, in Lat. 57° 4', Long. 3° 26' W, Height above Sea 1110 feet.
Distance from Sea 57 miles. During the MONTH of May 1859.

Days of Month.	BAROMETER.				SELF-REGISTERING THERMOMETERS.				HYGROMETER.				WIND.				RAIN.		CLOUD.	SUNSHINE.	THERMOMETERS. under Ground.			SEA.		ELECTRICITY.	GENERAL REMARKS. As to occurrence of Thunder, Lightning, Storms, Hail, Meteors, Remarkable Depression or Elevation of Barometer, etc. Mention the hour at which these began and ended.	Days of Month.	
	7 ^h A.M.		7 ^h P.M.		PROTECTED.		EXPOSED.		7 ^h A.M.		7 ^h P.M.		7 ^h A.M.		7 ^h P.M.		Days on which it fell.	Amount.			h. A.M.			Temperature.	Density.				Schmölzer 0 to 10
	Barometer.	Attached Thermometer.	Barometer.	Attached Thermometer.	Highest in Air.	Lowest in Air.	Max. Black bulb in Sun.	Min. Black bulb during Night.	Dry bulb.	Wet bulb.	Dry bulb.	Wet bulb.	Direction.	Force ↑↑.	Direction.	Force ↑↑.					3 inches.	19 inches.	22 inches.						
1	28.76		28.83		64.0	33.0	64.9	30.8	38.7	37.0	37.7	35.9	E	0	N.E.	0	0	10									1		
2	28.89		28.87		46.6	39.0	68.2	25.0	39.3	36.2	39.3	38.0	N	0	N.E.	0.2	0.01	0	10									2	
3	28.84		28.83		53.9	30.8	78.1	26.8	39.1	36.7	40.0	38.3	E	0	N.E.	0.2	0	0	10									3	
4	28.79		28.74		52.2	33.8	74.8	28.2	45.0	41.1	41.8	39.6	N.W.	0	N.E.	0.2	0	0	10									4	
5	28.73		28.78		57.2	31.1	74.0	25.3	44.0	39.9	43.3	41.2	N.W.	0.2	S	0.5	0	0	10									5	
6	28.76		28.79		57.4	31.8	68.7	25.7	47.8	42.9	46.2	44.2	N.W.	0.2	N.W.	1.5	0	0	10									6	
7	28.69		28.66		54.7	32.5	62.6	35.5	57.7	47.1	45.0	44.6	N.W.	1	N.W.	1	0	0	10									7	
8	28.89		29.01		59.7	36.6	82.8	29.8	48.2	43.2	45.9	43.0	N.W.	0.5	N.E.	0.5	0.12	0	10									8	
9	29.06		29.06		59.2	29.3	75.8	23.5	47.0	44.3	46.8	44.3	S	0	N.E.	1	0	0	10									9	
10	29.02		29.09		56.4	35.8	74.5	30.2	48.8	45.0	45.0	44.0	N.E.	0	S	1	0	0	10									10	
11	29.11		29.11		62.1	44.8	79.5	40.0	47.3	44.3	49.1	48.0	N	0.2	S	1.5	0	0	10									11	
12	29.06		29.01		63.3	45.9	73.2	41.2	53.9	50.2	53.8	52.1	N.W.	0.5	N.W.	1	0	0	10									12	
13	29.01		29.05		65.0	42.0	76.0	36.9	58.1	54.1	49.9	46.9	S	0	S	1	0	0	10									13	
14	29.07		28.99		65.4	36.3	79.8	28.1	56.0	49.1	49.1	46.2	S	0	S	1	0	0	10									14	
15	28.96		28.90		69.0	38.8	85.3	32.7	59.0	52.3	49.9	46.3	N.W.	0	N.W.	1	0	0	10									15	
16	28.93		28.86		64.8	37.0	77.8	28.1	56.2	50.0	51.1	48.2	S	0	S	1	0	0	10									16	
17	28.84		28.81		74.5	34.5	91.7	27.5	58.1	52.9	55.0	52.5	N.W.	0	S	0.5	0	0	10									17	
18	28.79		28.81		59.5	37.9	62.0	30.7	52.0	48.8	47.1	46.1	N.E.	0	N.E.	1	0	0	10									18	
19	28.83		28.83		53.8	46.6	62.0	45.2	48.5	47.6	50.0	49.2	S	0.5	S	0.2	0	0	10									19	
20	28.77		28.82		56.2	47.5	69.4	46.5	53.0	49.3	47.0	44.7	N.E.	0	S	0.5	0	0	10									20	
21	28.82		28.86		62.8	40.1	84.5	35.7	49.8	45.8	49.0	46.3	N.E.	0	N.E.	0.2	0	0	10									21	
22	28.95		28.99		62.7	40.0	81.7	37.0	52.8	48.6	49.4	47.4	N.E.	0	S	1	0	0	10									22	
23	28.99		28.93		65.0	41.0	84.2	34.5	57.7	52.0	49.2	47.0	N.E.	0	S	1	0	0	10									23	
24	28.85		28.78		64.0	37.0	84.2	33.0	55.6	50.3	49.8	49.2	S	0	N	1	0	0	10									24	
25	28.74		28.74		53.3	46.1	63.2	44.0	52.3	49.8	48.0	47.2	N	0	N.W.	0.2	0	0	10									25	
26	28.74		28.82		61.2	41.4	77.1	36.3	50.8	44.0	52.0	48.2	N.W.	0	N.W.	1	0.12	0	10									26	
27	28.86		28.86		72.7	44.8	98.2	40.1	57.0	53.7	54.6	50.3	N	0	N.E.	0.5	0.01	0	10									27	
28	28.84		28.80		70.0	35.7	93.0	31.9	62.3	53.3	50.8	47.0	S	0.2	N.E.	0.5	0	0	10									28	
29	28.72		28.76		73.0	33.0	99.1	28.5	58.0	51.8	52.0	55.1	N.E.	0.2	N.E.	0.5	0	0	10									29	
30	28.80		28.79		73.6	46.0	91.5	39.0	65.8	56.3	60.7	55.6	N.E.	0.2	N.E.	0.5	0	0	10									30	
31	28.76		28.73		72.2	43.8	93.1	37.2	66.4	57.0	59.0	54.8	N.E.	0.5	N.E.	0.5	0	0	10									31	
Sums.	394.39		394.94		1907	1192	2109	1229	1620	1476	1573	1444		4.2	21.7	4	0.26	157.0											
Means.	28.867		28.869		61.3	38.4	78.0	33.2	52.2	47.6	48.8	46.4		0.13	0.70			4.8											
Index Errors.	-.009		-.009		-	+1	+2	-1	-	-1	-	-1																	
Correction for Diurnal Range.	-.007		-.006		-1.7				-1.6	-1.4	-1.9	-1.4	Set					+1.8											
Corrected Means.	28.857		28.854		61.3	38.5	78.2	33.1	50.6	46.1	50.7	47.4	Set	0.13	0.70			5.6											
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		

Barometer, mean corrected reading of Column No. 1 (A.M.).....= 28.851 Column No. 3 (P.M.).....= 28.854
Diameter of tube 0.4 inch; correction for capillarity to be added.....+ 7 Capillarity.....= + 0.07
Sum..... 28.858 Sum..... 28.861
Correction for Temperature from Column No. 9 to be deducted.....= 61 Temp. from Col. 9.....= 53
Sum..... 28.797 Sum..... 28.808

Mean of the above 28.802
Correction for Height above Sea-level, 1110 feet, to add..... 1.250
Barometer corrected and reduced to 32° and Sea-level, 30.052

Dry bulb Thermometer (mean of Cols. 9 and 11),*..... 50.6
Wet bulb Thermometer (mean of Cols. 10 and 12),*..... 46.7
† Dew-point Temperature..... 42.6
† Elastic Force of Vapour..... 29.4
† Weight of Vapour in a Cubic Foot of Air.....
† Additional Weight required to Saturate a Cubic Foot.....
† Degree of Humidity (Saturation 100)..... 75

†† In the above columns for the registration of the Force of the Wind, may be entered the number of revolutions, by Professor Robinson's Cup Wind Gauge, which registers the velocity of the Wind—540 revolutions being equal to one statute mile.
* If the readings are taken at 9° and 3°, the 9° readings to be alone taken to account, as the correction for Diurnal Range in Scotland is unknown.
† All these calculated from Glaisher's Hygrometric Tables, Second Edition only.
† The Diurnal Range for Scotland is as yet unknown.

N.B.—This Schedule should be returned (post-paid) as early as possible after the completion of the Month, with the Sums correctly added, and the Means deducted. No Wax or Wafers ever to be employed in closing the Schedule—the Gummed Corner to be alone used.

(Signed) James Cameron M.A.
(Designation) The Secy

SUMMARY OF THE WINDS.											
Direction.	N	NE	E	SE	S	SW	W	NW	Calm or Variable.	Mean Force.	Mean Velocity in miles per day.
A.M.	4				6	7	3	1	20	0.13	5
P.M.	11	2	1	10	5	1			1	0.78	19
Mean.	5	1	1	5	8	4	2	1	10	0.45	12

Highest Reading Self-Registering Thermometer in Air and Protected, 74.5 on the 17
Lowest do. do. do. 29.3 on the 9
Difference, being Monthly Range, 45.2
Mean of Self-Registering Thermometers in Air and Protected, 48.2
Mean Daily Range in Air and Protected, 22.8
Greatest Daily Range, do., 40.0 on the 17
Highest Reading Self-Registering Black Bulb Thermometer in Sun, 98.2 on the 17
Lowest do. do. from Radiation during Night, 23.5 on the 9

[illegible]

OBSERVATIONS IN CONNECTION WITH THE PERIODICAL RETURN OF THE SEASONS.

Those persons who kindly assist Monthly Tables of the weather the Scottish Meteorological Society are requested to attend to the following Instructions, seeing that one of the most important objects of Meteorological Observations is their being comparable with one another; and for this purpose it is requisite that all should, if possible, observe at a like hour and in a like manner, and have their instruments placed in so far as circumstances allow, in a like position:

Hour of Observation.—All instruments which are observed twice a-day, should be read at the same hour morning and evening, in order to furnish mean results. The Society recommends a quarter before nine o'clock morning and evening, as the most convenient hour; but should this be inconvenient for the most observer, another hour may be chosen, attending however, to the above rule, that the evening and morning readings be taken at the same hour, and this hour agreed on the Scotchisle.

Brometer.—Barometers of Messrs Adie and Son's construction are recommended; but any instruments may be used which have adjustable surfaces, and have been compared. Before this instrument is selected for use it should be examined. In order to ascertain whether the space above the mercury is free from air: this is done by inclining the instrument somewhat from the vertical position, when, if free from air, the mercury will strike against the upper end of the tube with a sharp tap. The mercury should then completely fill the tube. If any air has got admittance, it should be driven into the cistern by reversing the instrument, and tapping it gently with the hand. If it cannot be thus expelled, the instrument is useless till repaired.

The Brometer should be hung in a good light, and perfectly perpendicular, as ascertained by the plumb line; and it ought always to be gently tapped before taking the reading, to prevent adhesion of the mercury to the tube. In reading the eye ought to be placed on the exact level of the top of the column of mercury. The reading of the attached Thermometer ought always to be the first taken, as the heat of the breath, or the proximity of the person, are apt to influence its reading.

The corrections necessary to be applied to the Barometric readings depend on the form of the instrument. The mode of making these corrections, and the tables employed for the purpose, will be found in the "Report of the Committee of the Royal Society on Physics and Meteorology," 1840, price 1s. The daily readings of the Brometer ought to be entered on the *Schellien's* as read off, and the corrections only applied to the mean for the month.

Self-Registering Thermometers and Hygrometers.—These should be placed adjacent of each other, in a place freely exposed to the air, but protected from sunshine, and from reflected heat, as well as from radiation from rain, and as near as may be, *four feet* from the general surface of the ground. Different contrivances are used for this purpose, either a double ventilated box with louver-board sides, fixed at a north window, and projecting 12 inches from the wall, so as to allow a free current of air to pass between the box and the wall; or in a double metal-sheet ventilated box with louver-board sides, fixed in an exposed place, and if possible over a window. Whatever means are finally decided on, the position of the instruments should be mentioned, and should not be changed, (without due notice being given to the Secretary,) in order that the results of one month's observations may be strictly comparable with those of another.

The *Self-Registering Thermometers* should be placed exactly horizontal. In the case of the ordinary *maximum* Thermometer, with clay, glass or steel index, the bulb may very slightly elevated, in order that the mercurial column may be somewhat aided by the force of gravity in pushing forward the float or index; and in the case of the *minimum* Thermometer, the bulb must be slightly depressed, to prevent falling of the spirit into the column. These Thermometers, if read once a-day, should always be read on the *ventilators* so that the temperatures marked by the floats indicate the minimum and the maximum of the day on which the reading is taken. N.B.—The readings of these instruments are taken from that extremity of the float which is nearest the head of the column of mercury or of spirit.

The *maximum* Registering Thermometer, for taking the extreme heat of the sun's rays, should have its bulb blackened and the surface rendered dull, and it should be mounted in a blackened box, whose sides should be so high as to protect the bulb from wind. It should be so placed that the sun's rays have free access to it during the heat of the day.

The *minimum* Registering Thermometer, for ascertaining the lowest temperature during the night from radiation, should have its bulb similarly blackened and rendered dull, and be similarly mounted. It should be laid out, about sunset, over grass, in a place freely exposed to the sky, but covered on wooden supports a few inches above the surface, and removed during the day.

Hygrometer.—The wet bulb requires the same attention to it to be often changed. In towns only, or close to the city, the weather is dusty, and the mistral, gas foul; in this country, wherever the mistral seems to be foul, the mistral should always be thoroughly wetted, and freed from starch, before being used; and the cotton wick, which conducts moisture to it, should be thoroughly wetted, else it will conduct the moisture more imperfectly, and yield false results. The cotton wick is best attached by passing its extremity through an aperture in the centre of the mastin, spreading that portion out so as to occupy equally round the bulb, and then tying the mastin over the wick. In frosty weather, water must be poured over the wick, and, so as to form a thin film of ice on the mastin, the evaporation from the ice going on as from the simply wetted bulb.

METEOROLOGICAL RETURNS.

May

SCOTTISH METEOROLOGICAL SOCIETY.

Observations taken at Pharmas, County of Aburdeen, in Lat. 57° 11', Long. 3° 24' W, Height above Sea 1110 feet.
Distance from Sea 40 miles. During the MONTH of June 1859.

Days of Month.	BAROMETER.				SELF-REGISTERING THERMOMETERS.				HYGROMETER.				WIND.				RAIN.		CLOUD.	SUNSHINE.	THERMOMETERS. under Ground.			SEA.		OZONE.	ELECTRICITY.	GENERAL REMARKS. As to occurrence of Thunder, Lightning, Storms, Hail, Meteors, Remarkable Depression or Elevation of Barometer, etc. Mention the hour at which these began and ended.	Days of Month.	
	9 h. A.M.		9 h. P.M.		PROTECTED.		EXPOSED.		9 h. A.M.		9 h. P.M.		9 h. A.M.		9 h. P.M.		Days on which it fell.	Amount.			h. A.M.			Temperature.	Density.					0 to 10
	Barometer.	Attach- ed Ther- meter	Barometer.	Attach- ed Ther- meter	Highest in Air.	Lowest in Air.	Max. Black bulb in Sun.	Min. Black bulb during Night.	Dry bulb.	Wet bulb.	Dry bulb.	Wet bulb.	Direction.	Force ↑↑	Direction.	Force ↑↑					3 inches. 12 inches. 22 inches.									
																					1 to 10	11 to 20	21 to 30							
1	28.80		28.82		72.8	61.2	55.2	57.8	54.0	54.0	54.0	54.0	N.W.	0	N.W.	0.5	0	0	0	0	0	0	0	0	0	0	Thunder	1		
2	28.83		28.84		60.0	47.5	50.0	57.9	48.7	47.6	46.2	46.2	N.W.	1.5	N.W.	0.5	0	0.01	0	0	0	0	0	0	0	0		2		
3	28.80		28.78		58.0	43.2	43.0	53.0	43.2	44.1	44.1	44.1	N.W.	1	N.W.	0.5	0	0	0	0	0	0	0	0	0	0		3		
4	28.81		28.88		69.2	47.0	48.2	57.0	50.0	53.4	51.9	51.9	N.W.	0.2	N.W.	1	0	0.25	0	0	0	0	0	0	0	0		4		
5	28.96		28.90		65.2	44.3	48.8	53.9	50.6	51.1	48.1	48.1	E	0.2	SW	1.5	0	0.04	0	0	0	0	0	0	0	0		5		
6	28.89		28.86		73.2	50.0	48.5	56.8	56.6	56.0	53.0	53.0	W	0	W	0.5	0	0.14	0	0	0	0	0	0	0	0		6		
7	28.93		28.89		70.8	45.7	49.3	54.0	53.7	55.1	57.8	57.8	SW	0.2	SW	0.2	0	0.03	0	0	0	0	0	0	0	0	Thunder or storm	7		
8	28.90		28.88		65.3	49.9	48.3	54.7	54.1	54.3	53.3	53.3	E	0	E	0	0	0	0	0	0	0	0	0	0	0		8		
9	28.89		28.86		67.9	46.5	47.7	54.8	49.5	46.1	44.2	44.2	N.W.	1.5	N.W.	0.5	0	0	0	0	0	0	0	0	0	0		9		
10	28.75		28.64		63.9	42.2	40.2	44.1	46.7	43.3	44.0	44.0	E	0.2	N.W.	0.5	0	0	0	0	0	0	0	0	0	0		10		
11	28.66		28.71		69.7	45.9	48.8	52.9	48.8	44.1	47.0	44.9	SW	0	N.W.	0.5	0	0	0	0	0	0	0	0	0	0		11		
12	28.76		28.74		72.3	50.8	48.1	53.5	50.1	50.2	58.2	58.2	N.W.	0	N.W.	0	0	0.11	0	0	0	0	0	0	0	0		12		
13	28.74		28.77		59.0	42.7	48.5	53.7	53.1	49.0	43.8	40.2	SW	0.5	SW	1	0	0.06	0	0	0	0	0	0	0	0		13		
14	28.80		28.76		58.7	40.0	48.8	53.6	45.1	44.3	57.0	46.9	W	1	SW	1	0	0	0	0	0	0	0	0	0	0		14		
15	28.65		28.63		59.2	47.0	46.8	51.9	50.1	48.2	42.0	42.0	N.W.	1	SW	1	0	0	0	0	0	0	0	0	0	0		15		
16	28.72		28.63		59.5	43.0	48.8	53.8	45.0	44.7	44.0	44.0	N.W.	0.5	SW	0.2	0	0	0	0	0	0	0	0	0	0		16		
17	28.84		28.80		68.7	47.0	49.0	53.3	50.5	48.3	57.2	53.9	N.W.	0	SW	0.5	0	0	0	0	0	0	0	0	0	0		17		
18	28.80		28.86		65.6	57.9	58.9	54.7	58.0	55.5	55.5	53.0	SW	0.5	SW	0.5	0	0.01	0	0	0	0	0	0	0	0		18		
19	28.77		28.76		64.0	57.2	58.8	53.2	55.8	55.5	54.2	54.2	SW	0.5	SW	0.5	0	0.14	0	0	0	0	0	0	0	0		19		
20	28.66		28.71		58.0	45.0	48.5	53.9	52.3	48.5	44.5	44.5	N.W.	1	E	1	0	0.30	0	0	0	0	0	0	0	0		20		
21	28.66		28.66		52.2	35.3	36.2	43.0	44.9	45.3	50.9	49.1	SW	0	SW	1.5	0	0.02	0	0	0	0	0	0	0	0		21		
22	28.57		28.49		61.0	47.0	47.6	54.3	54.9	44.5	44.7	44.7	SW	1	SW	1.5	0	0.23	0	0	0	0	0	0	0	0		22		
23	28.42		28.37		55.2	44.8	47.1	54.0	57.0	44.7	44.0	44.0	SW	1	SW	1.5	0	0.07	0	0	0	0	0	0	0	0	Thunder	23		
24	28.75		28.70		55.1	43.0	46.9	53.9	54.5	48.8	44.6	44.6	SW	0.5	SW	1	0	0.03	0	0	0	0	0	0	0	0		24		
25	28.64		28.71		66.8	47.6	48.6	54.4	57.0	46.4	46.6	46.6	SW	1	SW	1.5	0	0.23	0	0	0	0	0	0	0	0		25		
26	28.62		28.66		64.5	48.0	47.5	54.2	53.6	50.1	50.6	50.6	SW	0.2	SW	0.5	0	0.58	0	0	0	0	0	0	0	0	Thunder	26		
27	28.77		28.69		63.0	50.0	48.1	54.3	53.9	53.3	44.9	48.0	SW	1.5	SW	1.5	0	0	0	0	0	0	0	0	0	0		27		
28	29.03		28.96		62.5	38.0	47.2	54.5	55.0	57.2	50.2	48.7	SW	0	N.W.	0.5	0	0.85	0	0	0	0	0	0	0	0		28		
29	28.65		28.89		58.8	49.7	47.6	54.3	53.6	57.9	57.0	49.1	SW	0.2	SW	1	0	0	0	0	0	0	0	0	0	0		29		
30	29.04		28.96		66.0	36.7	49.3	53.2	57.6	50.6	48.7	48.7	N	0	N.W.	0.2	0	0	0	0	0	0	0	0	0	0		30		
31	29.07		29.07																									31		
Sums.	86307		86320		18972	13579	25815	12222	16258	15701	15453	14774	15.2	22.6	17	3.17	206													
Means.	28.769		28.770		63.2	46.0	48.3	40.7	54.2	50.3	51.5	49.2	0.75	0.75			Rain	6.8												
Corrected Index Errors.	-0.009		-0.009		—	+1	+2	—	—	—	—	—																		
Correction for Diurnal Range.	-0.012		+0.003		—	1.8			—	2.5	—	1.8	+0.7																	
Corrected Means.	28.748		28.764		63.2	45.1	48.3	40.6	57.8	48.1	53.3	49.8	0.75	0.75																
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			

Barometer, mean corrected reading of Column No. 1 (A.M.),.....= 28.748 Column No. 3 (P.M.),.....= 28.764
Diameter of tube 0.4 inch; correction for capillarity to be added.....+ 0.007 Capillarity,.....= + 0.007
Sum,..... 28.755 Sum,..... 28.771
Correction for Temperature from Column No. 3 to be deducted,.....= 0.066 Temp. from Col. 52° = 0.061
Sum,..... 28.689 Sum,..... 28.710

Mean of the above 28.699
Correction for Height above Sea-level, 1110 feet, to add,..... 1.261
Barometer corrected and reduced to 32° and Sea-level, 29.979

Dry bulb Thermometer (mean of Cols. 9 and 11),..... 57.5
Wet bulb Thermometer (mean of Cols. 10 and 12),..... 48.9
† Dew-point Temperature,..... 43.6
† Elastic Force of Vapour,..... 283.304
† Weight of Vapour in a Cubic Foot of Air,.....
† Additional Weight required to Saturate a Cubic Foot,.....
† Degree of Humidity (Saturation 100),..... 67 77

†† In the above columns for the registration of the Force of the Wind, may be entered the number of revolutions, by Professor Robinson's Cup Wind Gauge, which registers the velocity of the Wind—540 revolutions being equal to one statute mile.
* If the readings are taken at 9° and 3°, the 9° readings to be alone taken to account, as the correction for Diurnal Range in Scotland is unknown.
† All these calculated from Glaisher's Hygrometric Tables, Second Edition only.
‡ The Diurnal Range for Scotland is as yet unknown.

N.B.—This Schedule should be returned (post-paid) as early as possible after the completion of the Month, with the Sums correctly added, and the Means deducted. No Wax or Wafers ever to be employed in closing the Schedule—the Gummed Corner to be alone used.

Barometer, Highest observed reading of Month,.....= 29.070 on the 30th
Lowest do. do.,.....= 28.320 on the 22nd
Difference, or Monthly Range,.....= 0.750

SUMMARY OF THE WINDS.											
Direction.	N	NE	E	SE	S	SW	W	NW	Calm or Variable.	Mean Force.	Mean Velocity in miles per day.
A.M.	1	6	5	—	3	11	4	0	9	0.38	
P.M.	—	10	3	—	3	13	—	1	2	0.75	
Mean.	0.8	8	4	—	3	12	2	0.5	0.4	0.46	

Highest Reading Self-Registering Thermometer in Air and Protected,..... 73.2 on the 6th
Lowest do. do. do.,..... 35.3 on the 21st
Difference, being Monthly Range,..... 37.9
Mean of Self-Registering Thermometers in Air and Protected,..... 52.4
Mean Daily Range in Air and Protected,..... 18.1
Greatest Daily Range, do.,..... 31.6 on the 17th
Highest Reading Self-Registering Black Bulb Thermometer in Sun,..... 47 on the 6th
Lowest do. do. do. from Radiation during Night,..... 29.1 on the 11th

(Signed) James Cameron M.D.

(Designation) Sec. Sec.

INSTRUCTIONS FOR MAKING METEOROLOGICAL OBSERVATIONS.

Those persons who kindly furnish Monthly Tables of the weather to the Scottish Meteorological Society are requested to attend to the following Instructions, seeing that one of the most important ends of Meteorological Observations is their being comparable with one another; and for this purpose it is requisite that all should, if possible, observe at a like hour, and in a like manner, and have their instruments placed, in so far as circumstances allow, in a like position:

Hour of Observation.—All instruments which are observed twice a-day, should be read at the same hour morning and evening, in order to furnish mean results. The Society recommends a quarter before nine o'clock morning and evening, as the most convenient hour; but should this be inconvenient for the observer, another hour may be chosen, attending, however, to the above rule, that the evening and morning readings be taken at the same hour, and this hour entered on the Schedule.

Barometer.—Barometers of Messrs. Adie and Son's construction are recommended; but any instruments may be used which have adjustable surfaces, and have been compared. Before this instrument is suspended for use it should be examined in order to ascertain whether the space above the mercury is free from air. This is done by inclining the instrument somewhat from the vertical position, when, if free from air, the mercury will strike against the upper end of the tube with a sharp tap. The mercury should then completely fill the tube. If any air has got admittance, it should be driven into the cistern by reversing the instrument, and tapping it gently with the hand. If it cannot be thus expelled, the instrument is useless till repaired.

The Barometer should be hung in a good light, and perfectly perpendicular, as ascertained by the plumb line; and it ought always to be gently tapped before taking the reading, to prevent adhesion of the mercury to the tube. In reading the eye ought to be placed on the exact level of the top of the column of mercury. The reading of the attached Thermometer ought always to be the first taken, as the heat of the breath, or the proximity of the person, are apt to influence its readings.

The corrections necessary to be applied to the Barometric readings depend on the form of the instrument. The mode of making these corrections, and the tables employed for the purpose, will be found in the "Report of the Committee of the Royal Society on Physics and Meteorology," 1840, page 18. The daily readings of the Barometer ought to be entered on the Schedule as read off, and the correction only applied to the mean for the month. *Self-registering Thermometers and Hygrometers.*—These should be placed alongside of each other, in a place freely exposed to the air, but protected from sunshine, and from reflected heat, as well as from radiation and from rain, and as near as may be, far from the general surface of the ground. Unfractured box-ventilators are used for this purpose, either a double ventilated box with louver-boarded sides, fixed at a north window, and project 12 inches from the wall, so as to allow a free current of air to pass between the box and the wall; or in a double meat-safe ventilated box with louver-boarded sides, fixed in an exposed place, and if possible over grass. Whatever means are finally decided on, the position of the instruments should be mentioned, and should not be changed (without due notice being given to the Secretary), in order that the results of one month's observations may be strictly comparable with those of another.

The *Self-registering Thermometers* should be placed exactly horizontal. In the case of the ordinary maximum Thermometer, with clay, glass, or steel index, the bulb may be very slightly elevated, in order that the mercurial column may be somewhat aided by the force of gravity in pushing forward the float or index; and in the case of the minimum Thermometer, the bulb must be slightly depressed, to prevent draining of the spirit to the top of the tube, and also that any part raised in vapour may return to the column. These Thermometers, if read once a-day, should always be read on the evening, so that the temperatures marked by the float indicate the minimum and maximum of the day on which the reading is taken. N.B.—The readings of these instruments are taken from their extremity of the float which is nearest the head of the column of mercury or of spirit.

The maximum registering Thermometer for taking the extreme heat of the sun's rays, should have its bulb blackened and the surface rendered dull, and it should be mounted in a blackened box, whose sides should be so high as to protect the bulb from wind. It should be so placed that the sun's rays have free access to it during the heat of the day.

The minimum registering Thermometer, for ascertaining the lowest temperature during the night from radiation, should have its bulb similarly blackened and rendered dull, and be similarly mounted. It should be laid out, about sunset, over grass, in a place freely exposed to the sky, but raised on wooden supports a few inches above the surface, and removed during the day.

Hygrometer.—The wet bulb requires the muslin covering it to be often changed. In towns once a month, or oftener, if the weather is dusty, and the muslin gets foul; in the country whenever the muslin seems to be foul. The muslin should always be thoroughly wetted, and freed from starch, before being used; and the cotton wick which conducts moisture to it should be thoroughly wetted, also it will conduct the moisture imperfectly, and yield false results. The cotton wick is best attached by passing its extremity through an aperture in the centre of the muslin, spreading that portion out so as to apply equally round the bulb, and then tying the muslin over the wet bulb, so as to form a thin film of ice on the muslin, the evaporation from the ice going on as from the simply wetted bulb.

Rain Gauge.—As "Plummet's Rain Gauge" seem to possess several advantages over others, the Society gives the preference to them; but whatever form be employed, in order that all the stations may yield comparable results, it is recommended that the Gauge be sunk in the ground, so that the top of the receiver is nearly on a level with the top blades of close cut grass, in a place as distant as possible from trees, houses, high walls, and irregular or broken ground, and the quantity of Rain, should, if possible, be registered daily. When more than one Rain Gauge is kept, they ought to be placed near each other, but at different heights above the ground, and their indications noted in the general remarks, mentioning their height above ground—the regular column in the Schedule being reserved for the ground Rain Gauge alone.

Winds.—Isolated Wind-vanes or Weather-cocks are apt to give false indications of the general direction of the wind, in consequence of the currents of air at the surface of the ground being so much influenced by the neighbourhood of hills, valleys, buildings, etc. Where low clouds are seen drifting along their direction in reference to known objects, or as noted by means of a mirror on which a compass may be laid, or by means of a circular mirror fixed over the centre of a pocket compass, will, in general, give the true direction of the current of air near the earth's surface if these clouds are near and immediately over head, that is, in or near the zenith of the observer. The motion of the higher strata of clouds gives no such indication. Failing the clouds, the general direction of the smoke of a house or village, or of a tall chimney, gives a better indication of the general direction of the wind than any wind-vane. The observer should state whether he has ascertained the direction by reflection or otherwise. For mode of estimating the force of the wind, see "Directions for Reading Instruments." Lind's Anemometer is commonly used for this purpose, but the best Anemometer of moderate price yet invented is Professor Robinson's Cup Wind Gauge, which registers the velocity of the wind—540 revolutions of the cups, as registered by the instrument, being equal to one statute mile.

Clouds.—The Society recommends observers to adopt the Howard nomenclature of clouds. The scale of cloud in the visible sky is reckoned from 0 to 10. Thus, a sky quite free from cloud is 0; a sky half covered with cloud is 5; and the whole visible sky covered with cloud is 10. Clouds often cover three-fourths or even more of the visible sky without obstructing the sun's shining, so that the indications noted in the column for clouds would not necessarily express, or agree with, the column for sunshine. As the full moon, so long as it is above the horizon, is thought by some eminent astronomers to have a powerful effect in dissipating clouds, it would be well to note in the General Remarks any facts bearing on this point, for a few days (or nights, as the case may be) before and after every full moon; and the same observations ought to be made at the periods of new moon.

Sunshine.—The number of hours the sun shines during the day should be entered in the proper column.

Thermometers under Ground.—Though the temperature and hygrometric condition of the air are those which chiefly influence the growth of crops, it is important for the health of the crop, and for the germination of the seed, that the soil itself should have a certain temperature. To collect facts which may illustrate this, it is recommended to have Thermometers sunk 3, 12, and 22 inches below the surface of the ground, to ascertain the temperature of what may be termed the agricultural soil; and the observer should enter in the Schedule the kind of soil; whether drained or undrained; and whether naturally wet or dry.

Temperature of the Sea.—As the meteorology of the island is incomplete without a knowledge of the mean temperature of the Ocean which surrounds it, the Society strongly recommends taking the temperature of the Sea at a depth of 6 feet or 1 fathom from the end of all piers or rocks round the coast, where free from the influence of river waters, and as near as may be about the time of high-water. A Thermometer, with its bulb fixed in a small tin pitcher, covered with a sloping lid and with a weight attached, is sunk to the required depth, and in ten minutes drawn up and read. The density of the sea water should, if possible, be taken at the same time. Convenient instruments are furnished by Messrs Adie and Son.

Temperature of Springs.—The temperature of Springs or Deep Wells is recommended to be taken whenever practicable, mentioning whether Spring or Well, and its depth from the surface. Messrs. Adie and Son, of Glasgow, have a portable apparatus for determining the temperature of the Sea at any depth, and for determining the temperature of the air at any height, together with the exact hour at which they were first seen, their continuance, and direction.

Budding, Leafing, and Flowering of Trees.—It is necessary to bear in mind that varieties of the same species of tree differ widely in their times of leafing and flowering. Individual Trees or Shrubs of each kind should therefore be chosen (if possible early kinds), and their indications should be alone noted—always the same plant from year to year being noticed.

Ozone.—Mention whether Schonbein's or Moffat's scale and papers are used. Schonbein's are preferred. They may be had at Messrs. Adie and Son's, 50, Princess Street, and at Mr. Bryson's, 69, Princes Street, Edinburgh.

Electricity.—Rift balls suspended by a linen thread, in connection with a metallic conductor, and under cover, and the degree of a circle being used to express the degree of repulsion, form a cheap and convenient Electrometer. Excised glass or sealing-wax ascertains the nature of the electricity.

SHRUBS, ETC.		FRUIT.		MIGRATORY BIRDS.		FOREST TREES.		CROPS.	
First in Blossom.		First in Blossom.		First in Blossom.		In Flower.		First in Blossom.	
Apple.		Black Currant.		Cuckoo.		Barley.		Wheat.	
Bartlett or Elder.		Black Currant.		Cuckoo.		Bare or Blight.		Wheat.	
Broom.		Black Currant.		Cuckoo.		Wheat.		Wheat.	
Hazel.		Black Currant.		Cuckoo.		Wheat.		Wheat.	
Hawthorn.		Black Currant.		Cuckoo.		Wheat.		Wheat.	
Holly.		Black Currant.		Cuckoo.		Wheat.		Wheat.	
Laburnum.		Black Currant.		Cuckoo.		Wheat.		Wheat.	
Lilac.		Black Currant.		Cuckoo.		Wheat.		Wheat.	
Mezereum.		Black Currant.		Cuckoo.		Wheat.		Wheat.	
Mountain Ash or Rowan.		Black Currant.		Cuckoo.		Wheat.		Wheat.	
Red Flowering Currant.		Black Currant.		Cuckoo.		Wheat.		Wheat.	
Rhododendron Ponticum.		Black Currant.		Cuckoo.		Wheat.		Wheat.	
Whin.		Black Currant.		Cuckoo.		Wheat.		Wheat.	

OBSERVATIONS IN CONNECTION WITH THE PERIODICAL RETURN OF THE SEASONS.

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

Mr. J. D. Everett

Secy Meteorological Society,

10, St. Andrew Square,

Edinburgh.

G.H.

1859
JUN 18

1859
JUN 18

1859
JUN 18

1859
JUN 18

SCOTTISH METEOROLOGICAL SOCIETY.

Observations taken at Braemar, County of Abertoe, in Lat. 57°N, Long. 3°44'W, Height above Sea 1110 feet.

Distance from Sea 40 miles.

During the MONTH of July 1859.

Days of Month.	BAROMETER.				SELF-REGISTERING THERMOMETERS.				HYGROMETER.				WIND.				RAIN.		CLOUD.	SUNSHINE.	THERMOMETERS. under Ground.			SEA.		ELECTRICITY.	GENERAL REMARKS. As to occurrence of Thunder, Lightning, Storms, Hail, Meteors, Remarkable Depression or Elevation of Barometer, etc. Mention the hour at which these began and ended.	Days of Month.	
	9 ^h A.M.		9 ^h P.M.		PROTECTED.		EXPOSED.		9 ^h A.M.		9 ^h P.M.		9 ^h A.M.		9 ^h P.M.		Days on which it fell.	Amount.			h. A.M.			Temperature.	Density.				OZONE.
	Barometer.	Attached Thermometer.	Barometer.	Attached Thermometer.	Highest in Air.	Lowest in Air.	Max. Black bulb in Sun.	Min. Black bulb during Night.	Dry bulb.	Wet bulb.	Dry bulb.	Wet bulb.	Direction.	Force ††.	Direction.	Force ††.					3 inches.	12 inches.	22 inches.							0 to 10.
	inches.		inches.														days.	inches.	1 to 10.	Hours.					A.M.	P.M.			
1	29.07		29.11		65.7	33.3	92.2	31.8	59.0	53.0	57.8	48.3	S	0	N.E.	0.5	0	0.2									1		
2	29.11		29.08		65.3	37.9	95.2	35.9	55.2	51.7	54.8	57.0	S	0	N.E.	0.5	0	0.5									2		
3	29.05		29.01		68.5	41.3	91.8	38.4	60.0	50.0	55.5	52.6	N.W.	0	N.E.	0.5	0	0.5									3		
4	28.98		29.00		66.0	50.8	88.8	50.0	53.3	57.9	58.1	56.9	N.W.	0	S	0.5	0	0.5									4		
5	29.06		29.09		66.0	53.2	73.0	49.0	61.8	58.2	55.0	54.3	N.W.	0	N.W.	0.2	0.06	0.5									5		
6	29.08		29.02		62.8	49.9	75.8	49.0	56.8	55.7	56.1	53.9	N.W.	0	N.W.	0.2	0.49	0.5									6		
7	28.92		28.93		67.0	53.6	79.0	50.8	58.2	55.3	55.1	51.9	N.W.	0	N.W.	1.	0.02	0.5									7		
8	28.94		29.01		71.0	57.5	88.6	50.3	61.8	57.0	55.2	57.3	N.W.	0.5	N.W.	0.5	0.06	0.5									8		
9	29.03		29.04		73.2	43.4	95.4	39.8	58.2	53.0	60.1	57.0	N	0.2	N.W.	0.5	0	0.5									9		
10	29.04		29.04		72.3	55.2	90.2	52.2	63.3	59.0	60.1	59.4	N.E.	0.2	N.E.	0.2	0	0.5									10		
11	28.97		28.63		69.2	54.3	79.2	49.2	60.4	59.1	66.3	60.2	N.W.	0.5	N.W.	2.0	0.02	0.5									11		
12	28.79		28.98		69.7	53.7	82.6	50.8	56.9	51.8	54.0	50.0	N.W.	5.	N	1	0.01	0.5									12		
13	28.95		29.07		60.0	44.9	77.8	37.8	57.1	50.0	52.1	48.3	N.W.	0	N.W.	1	0.04	0.5									13		
14	29.09		29.00		64.8	44.0	87.1	39.2	57.0	52.4	54.7	51.8	N.W.	2	N.W.	1	0.08	0.5									14		
15	28.92		28.95		69.2	50.2	86.9	47.9	57.1	53.7	54.8	51.7	N.W.	0.2	N	1	0.01	0.5									15		
16	28.94		28.83		69.8	48.3	84.7	43.2	62.1	57.2	61.1	58.8	N.W.	1	N.W.	1.5	0	0.5									16		
17	28.71		28.75		68.0	50.0	86.8	44.8	57.0	55.8	52.3	48.2	N.W.	0.2	N.W.	0.5	0.34	0.5									17		
18	28.74		28.81		54.2	46.4	65.4	45.1	50.1	47.3	49.3	47.3	N.E.	0	N.E.	0.2	0.03	0.5									18		
19	28.86		28.89		56.2	46.2	67.0	45.3	50.1	47.8	49.2	48.3	N.E.	0.2	N.E.	0.2	0	0.5									19		
20	28.94		28.96		65.6	48.4	84.6	48.2	52.3	57.9	55.5	51.5	N.E.	0	S	0.5	0.02	0.5									20		
21	28.95		28.91		73.0	57.2	96.2	54.0	61.0	58.0	60.0	56.8	N.W.	0.2	N.W.	0.2	0.01	0.5									21		
22	28.87		28.82		70.8	53.3	93.0	52.0	56.6	54.0	53.8	49.3	N.E.	0.2	N.E.	0.2	0	0.5									22		
23	28.84		28.90		55.3	47.0	71.0	46.0	49.8	48.0	48.1	47.0	N.E.	0.5	N.E.	0.2	0.29	0.5									23		
24	28.94		28.90		70.8	44.0	95.3	39.2	57.9	52.1	58.2	54.3	N.W.	0	N.W.	0.5	0	0.5									24		
25	28.82		28.74		66.0	52.7	78.9	48.0	58.3	54.9	55.5	52.1	N.W.	0.2	N.W.	1	0	0.5									25		
26	28.76		28.61		62.0	53.5	69.1	50.8	59.0	55.0	58.9	55.1	N.W.	0.5	N.W.	2	0	0.5									26		
27	28.59		28.69		62.0	56.0	77.7	55.0	58.2	52.2	56.0	52.1	N.W.	4	N.W.	1.5	0.02	0.5									27		
28	28.68		28.75		64.0	53.0	81.3	50.0	56.3	52.1	53.0	49.1	N.W.	4	N.W.	1.0	0.01	0.5									28		
29	28.81		28.85		62.0	49.8	88.7	45.2	54.8	49.8	51.0	47.7	N.W.	0.5	N.W.	1	0	0.5									29		
30	28.82		28.82		60.8	35.3	76.8	29.0	53.0	49.4	54.0	50.8	N	0	N.E.	1	0	0.5									30		
31	28.01		28.11		63.0	57.8	78.8	49.0	57.0	55.2	52.2	49.5	N.W.	4	N.W.	5	0.46	0.5									31		
Sums.	895.28		894.95		2037.2	1508.3	2560.1	1195.7	763.6	654.9	712.0	662.05		24.1		30.1	17	1.97	49.7										
Means.	28.880		28.869		65.7	48.6	82.5	45.7	56.8	53.3	55.2	52.2		0.77		0.97		6.4											
Index Errors.	-.009		-.009		-.2	+.2	—	—	-.1	—	-.1	—																	
Correction for Diurnal Range.	-.010		-.001		-.1	—	—	—	-.2	-.0	-.1	+.1						-.7											
Corrected Means.	28.861		28.859		65.7	48.8	82.7	45.7	57.8	57.6	57.1	53.2		0.77		0.97		5.7											
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		

Barometer, mean corrected reading of Column No. 1 (A.M.),.....= 28.861

Column No. 3 (P.M.),.....= 28.859

Barometer, Highest observed reading of Month,.....= 29.11 on the 1st

Diameter of tube 0.4 inch; correction for capillarity to be added,.....+ .007

Capillarity,.....= + .007

Lowest do. do.,.....= 28.01 on the 31st

Sum,..... 28.868

Sum,..... 28.866

Difference, or Monthly Range,.....= 1.10

Correction for Temperature from Column No. 2 to be deducted,.....= .074

Temp. from Col. 2,.....= .069

Sum,..... 28.794

Sum,..... 28.797

Mean of the above 28.795

Correction for Height above Sea-level, 1110 feet, to add,..... 1.250

Barometer corrected and reduced to 32° and Sea-level, 30.045

SUMMARY OF THE WINDS.										
Direction.	N	NE	E	SE	S	SW	W	NW	Calm or Variable.	Mean Force.
A.M.	—	4	2	3	2	17	3	—	12	0.77
P.M.	—	8	1	2	7	10	2	1	—	0.97
Mean.	—	6	2	2	5	13	2	1	6	0.87

Dry bulb Thermometer (mean of Cols. 9 and 11),*..... 55.9

Wet bulb Thermometer (mean of Cols. 10 and 12),*..... 52.4

† Dew-point Temperature,..... 49.1

† Elastic Force of Vapour,..... 3.57

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

† Additional Weight required to Saturate a Cubic Foot,.....

† Degree of Humidity (Saturation 100),..... 79

Highest Reading Self-Registering Thermometer in Air and Protected, 73.2 on the 9th

Lowest do. do. do., 33.3 on the 1st

Difference, being Monthly Range,..... 39.9

Mean of Self-Registering Thermometers in Air and Protected, 55.3

Mean Daily Range in Air and Protected, 16.9

Greatest Daily Range, do., 32.4 on the 1st

Highest Reading Self-Registering Black Bulb Thermometer in Sun, 46.2 on the 21st

Lowest do. do. from Radiation during Night, 29 on the 30th

(Signed) James Cameron M.A.

(Designation) Thos. Pearce

N.B.—This Schedule should be returned (post-paid) as early as possible after the completion of the Month, with the Sums correctly added, and the Means deduced. No Wax or Wafers ever to be employed in closing the Schedule—the Gummed Corner to be alone used.

INSTRUCTIONS FOR MAKING METEOROLOGICAL OBSERVATIONS.

Those persons who kindly furnish Monthly Tables of the Weather to the Scottish Meteorological Society are requested to attend to the following Instructions, seeing that one of the most important ends of Meteorological Observations is their being comparable with one another; and for this purpose it is requisite that all should, if possible, observe at a like hour, and in a like manner, and have their instruments placed, in so far as circumstances allow, in a like position.

Hour of Observation.—All instruments which are observed twice a day, should be read at the same hour morning and evening, in order to furnish mean results. The Society recommends a quarter before nine o'clock morning and evening, as the most convenient hour; but should this be inconvenient for the observer, another hour may be chosen, attending, however, to the above rule, that the evening and morning readings be taken at the same hour; and this hour entered on the Schedule.

Barometer.—Barometers of Messrs. Adie and Son's construction are recommended; but any instruments may be used which have adjustable surfaces, and have been compared. Before this instrument is suspended for use it should be examined, in order to ascertain whether the space above the mercury is free from air. This is done by inclining the instrument somewhat from the vertical position, when, if free from air, the mercury will strike against the upper end of the tube with a sharp tap. The mercury should then completely fill the tube. If any air has got admittance, it should be driven into the cistern by reversing the instrument, and tapping it gently with the hand. If it cannot be thus expelled, the instrument is useless till repaired.

The Barometer should be hung in a good light, and perfectly perpendicular, as ascertained by the plumb line; and it ought always to be gently tapped before taking the reading to prevent adhesion of the mercury to the tube. In reading, the eye ought to be placed on the exact level of the top of the column of mercury. The reading of the attached Thermometer ought always to be the first taken, as the heat of the breath, or the proximity of the person, are apt to influence its readings.

The corrections necessary to be applied to the Barometric readings depend on the form of the instrument. The mode of making these corrections, and the tables employed for the purpose, will be found in the "Report of the Committee of the Royal Society on Physics and Meteorology," 1840, price 1s. The daily readings of the Barometer ought to be entered on the Schedule as read off, and the corrections only applied to the mean for the month.

Self-Registering Thermometers and Hygrometers.—These should be placed alongside of each other, in a place freely exposed to the air, but protected from sunbining, and from pelleted heat, as well as from radiation and from rain, and as near as may be four feet from the general surface of the ground. Different contrivances are used for this purpose, either a double ventilated box with louver-boarded sides, fixed at a north window, and projecting 12 inches from the wall, so as to allow a free current of air to pass between the box and the wall; or in a double meat-safe ventilated box with louver-boarded sides, fixed in an exposed place, and if possible over grass. Whatever means are finally decided on, the position of the instruments should be mentioned, and should not be changed (without due notice being given to the Secretary), in order that the results of one month's observations may be strictly comparable with those of another.

The *Self-Registering Thermometers* should be placed exactly horizontal. In the case of the ordinary *maximum* Thermometer, with dry glass, or steel index, the bulb may be very slightly elevated, in order that the mercurial column may be somewhat aided by the force of gravity in pushing forward the float or index; and in the case of the *minimum* Thermometer, the bulb must be slightly depressed, to prevent a draining of the spirit to the top of the tube, and also that any part raised in vapour may return to the column. These Thermometers, if read once a-day, should always be read on the evening, so that the temperatures marked by the floats indicate the minimum and the maximum of the day on which the reading is taken. N.B.—The readings of these instruments are taken from that extremity of the float which is nearest the head of the column of mercury or of spirit.

The maximum Registering Thermometer, for taking the extreme heat of the sun's rays, should have its bulb blackened and the surface rendered dull, and it should be mounted in a blackened box, whose sides should be so high as to protect the bulb from wind. It should be so placed that the sun's rays have free access to it during the heat of the day.

The *minimum Registering Thermometer*, for ascertaining the lowest temperature during the night from radiation, should have its bulb slightly blackened and rendered dull, and be similarly mounted. It should be laid out about sunset, over grass, in a place freely exposed to the sky, but raised on wooden supports a few inches above the surface, and removed during the day.

Hygrometer.—The wet bulb requires the muslin covering it to be often changed. In towns once a month, or oftener, if the weather is dusty, and the muslin gets foul; in the country whenever the muslin seems to be foul. The muslin should always be thoroughly wetted, and freed from starch, before being used; and the cotton wick which conducts moisture to it should be thoroughly wetted, else it will conduct the moisture imperfectly, and yield false results. The cotton wick is best attached by passing its extremity through an aperture in the centre of the muslin, spreading that portion out, so as to apply equally round the bulb, and then tying the muslin over the wet bulb, so as to form a thin film of ice on the muslin, the evaporation from the ice going on as from the simply wetted bulb.

Rain Gauge.—As "Fleming's Rain Gauge" seems to possess several advantages over others, the Society gives the preference to them; but whatever form be employed, in order that all the stations may yield comparable results, it is recommended that the Gauge be sunk in the ground, so that the top of the receiver is nearly on a level with the top blades of close cut grass, in a place as distant as possible from trees, houses, high walls, and irregular or broken ground, and the quantity of Rain Gauge's kept, they ought to be placed near each other, but at different heights above the ground, and their indications noted in the general column in the Schedule being reserved for the ground Rain Gauge alone.

Wind.—Isolated Wind-vanes or Weather-cocks are apt to give false indications of the general direction of the wind, in consequence of the currents of air at the surface of the ground being so much influenced by the neighbourhood of hills, valleys, buildings, etc. Where low clouds are seen drifting along their direction in reference to known objects, or as noted by means of a mirror fixed over the centre of a pocket compass, with, in general, give the true direction of the current of air near the earth's surface if these clouds are near and immediately over head, that is, in or near the zenith of the observer. The motion of the clouds, the strata of clouds gives no such indication. Failing the clouds, the general direction of the motion of a hamlet or village, or of a tall chimney, gives a better indication of the general direction of the wind than any wind-vane. The observer should state whether he has ascertained the direction by reflection or otherwise. For mode of estimating the force of the wind, see "Directions for Reading Instruments." Lind's Anemometer is commonly used for this purpose, but the best Anemometer of moderate price yet invented is Professor Robinson's Cup Wind Gauge, which registers the velocity of the wind—540 revolutions of the cups, as registered by the instrument, being equal to one statute mile.

Clouds.—The Society recommends observers to adopt the Howard nomenclature of clouds. The scale of cloud in the visible sky is reckoned from 0 to 10. Thus a sky quite free from cloud is 0; a sky half covered with cloud is 5; and the whole visible sky covered with cloud is 10. Clouds often cover three-fourths or even more of the visible sky without obstructing the sunshine, so that the indications noted in the column for clouds would not necessarily express, or agree with, the column for sunshine. As the full moon, so long as it is above the horizon, is dispelled by some eminent astronomers to have a powerful effect in dissipating clouds, it would be well to note in the General Remarks any facts bearing on this point, for a few days (or nights, as the case may be) before and after every full moon; and the same observations ought to be made at the periods of new moon.

Sunshine.—The number of hours the sun shines during the day should be entered in the proper column.

Thermometers under Ground.—Though the temperature and hygrometric conditions of the air are those which chiefly influence the growth of crops, it is important for the health of the crop, and for the germination of the seed, that the soil itself should have a certain temperature. To collect facts which may illustrate this, it is recommended to have Thermometers sunk 3, 12, and 22 inches below the surface of the ground, to ascertain the temperature of what may be termed the agricultural soil; and the observer should enter in the Schedule the kind of soil; whether drained or undrained; and whether naturally wet or dry.

Temperature of the Sea.—As the meteorology of the island is incomplete without a knowledge of the mean temperature of the Ocean which surrounds it, the Society strongly recommends taking the temperature of the Sea at a depth of 6 feet or 1 fathom from the end of all piers or rocks round the coast, where free from the influence of river water, and as near as may be about the time of high water. A Thermometer, with its bulb fixed in a small tin pitcher, covered with a stopper, and with a weight attached, is sunk to the required depth, and in ten minutes drawn up and read. The depth of the sea water should, if possible, be taken at the same time. Convenient instruments are furnished by Messrs. Adie and Son.

Temperature of Springs.—The temperature of Springs or Deep Wells is recommended to be taken whenever practicable, mentioning whether Spring or Well, and its depth from the surface. *Meteors.* Aurora Borealis, Remarkable Depression or Elevation of Barometer, Remarkable Falls of Rain, Hail or Snow, Thunder and Lightning, etc., should be specially noticed, together with the exact hour at which they were first seen, their continuance, and direction.

Birding, Leafing, and Flowering of Trees.—It is necessary to bear in mind that varieties of the same species of tree differ widely in their times of leafing and flowering. Individual Trees or Shrubs of each kind should therefore be chosen (if possible early kinds), and their indications should be alone noted—always the same plant from year to year being noticed.

Ozone.—Mention whether Schönbein's or Meiffert's scale and papers are used. Schönbein's are preferred. They may be had at Messrs. Adie and Son's, 30, Princes Street, and at Mr. Bryson's, 60, Princes Street, Edinburgh.

Electricity.—Foil balls suspended by a linen thread, in connection with a metallic conductor, and under cover, and the degrees of a circle being used to express the degree of repulsion, form a cheap and convenient Electrometer. Exposed glass or sealing-wax ascertains the nature of the electricity.

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, diseases, etc. Whether Epizootic disease prevails among Cattle; and the Agricultural condition of the district generally.

SHRUBS, ETC.		FRUIT.		MORATORY BIRDS.		Other Birds, naming them	
First in Blossom.	First in Blossom.	First in Blossom.	First in Blossom.	First in Blossom.	First in Blossom.	First in Blossom.	First in Blossom.
Barberry,		Apple,		Cuckoo,		Swallow,	
Broom,		Black Currant,		House-Swallow,		Plover,	
Bartree or Elder,		Cherry,		Sand-Martin,		Starling,	
Hazel,		Gooseberry,		Lapwing,		Swan,	
Holly,		Peach,		Curlew,		Other Birds, naming them	
Laburnum,		Pear,					
Lilac,		Plum,					
Mezereon,		Strawberry,					
Mountain Ash or Rowan,							
Red Flowering Currant,							
Rhododendron Ponticum,							
Whin,							

OBSERVATIONS IN CONNECTION WITH THE PERIODICAL RETURN OF THE SEASONS.

FOREST TREES.		CROPS.		Other Crops.		Other Crops.	
In Flower.	In Flower.	In Flower.	In Flower.	In Flower.	In Flower.	In Flower.	In Flower.
Alder,		Barley,		Wheat,		Peas,	
Asb.,		Bare or Bigg,		Oats,		Beans,	
Beech,				Vegetables,		Potatoes,	
Birch,				Turnips,		Rye Grass,	
Blm.,							
Larch,							
Lim.,							
Oak,							
Sycamore or Plane,							

EDINBURGH.

Street,

21, P.

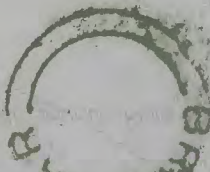
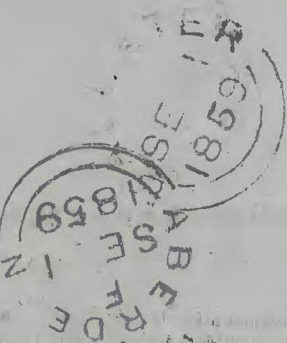
Sec., Meteorological Society,

DR STARK,

To

To

July 1856



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SCOTTISH METEOROLOGICAL SOCIETY.

Observations taken at Braemar, County of Aberdeen, in Lat. 57° 11', Long. 3° 24' W, Height above Sea 1110 feet.
Distance from Sea 40 miles. During the MONTH of September 1859.

Days of Month.	BAROMETER.				SELF-REGISTERING THERMOMETERS.				HYGROMETER.				WIND.				RAIN.		CLOUD.	SUNSHINE.	THERMOMETERS. under Ground.			SEA.		OZONE.	ELECTRICITY.	GENERAL REMARKS. As to occurrence of Thunder, Lightning, Storms, Hail, Meteors, Remarkable Depression or Elevation of Barometer, etc. Mention the hour at which these began and ended.	Days of Month.		
	9 ^h . A.M.		9 ^h . P.M.		PROTECTED.		EXPOSED.		9 ^h . A.M.		9 ^h . P.M.		9 ^h . A.M.		9 ^h . P.M.		Days on which it fell.	Amount.			9 ^h . A.M.			Temperature of Spring or Well.	Temperature.					Density.	0 to 10
	Barometer.	Attach- ed Ther- mometer.	Barometer.	Attach- ed Ther- mometer.	Highest in Air.	Lowest in Air.	Max. Black bulb in Sun.	Min. Black bulb during Night.	Dry bulb.	Wet bulb.	Dry bulb.	Wet bulb.	Direction.	Force.	Direction.	Force.					— 9 ^h . A.M. —										
																					3 inches.	12 inches.	23 inches.								
1	28.21		28.38		55.0	47.0	64.0	44.0	49.7	48.0	47.6	45.7	SW	0.2	SW	2	0.12	cu							A.M. P.M.			1			
2	28.44		28.57		56.2	42.7	73.6	39.0	48.9	44.7	45.8	43.6	SW	0.5	SW	1	0.01	cu								10.9			2		
3	28.54		28.63		53.9	40.2	67.8	35.0	50.0	46.2	47.4	40.4	SW	0	SW	1	0	cu								9.8	Lightning	Aurora Borealis	3		
4	28.76		28.95		56.3	42.2	74.0	39.0	49.7	46.8	46.3	44.7	SW	0.5	SW	0.5	0.04	cu								9.8		do	4		
5	29.00		28.84		57.0	38.2	83.6	33.6	45.9	43.9	49.9	47.4	SW	0.5	SW	0.5	0.03	cu								8.8			5		
6	28.49		28.38		57.0	48.1	67.0	45.2	49.8	48.3	49.3	47.8	SW	0.5	SW	0.5	0.17	cu								9.9			6		
7	28.47		28.60		62.3	46.0	85.0	42.0	53.8	50.8	52.8	49.7	SW	0	SW	0.2	0.02	cu								8.8			7		
8	28.63		28.61		61.5	48.8	78.9	46.3	53.0	50.7	52.2	48.3	SW	0	SW	0.5	0.02	cu								9.8			8		
9	28.08		28.30		55.0	49.4	66.1	47.1	53.0	49.5	50.2	47.4	SW	3	SW	5	0.14	cu								10.10			9		
10	28.53		28.90		52.8	46.0	68.7	42.0	44.5	47.7	47.6	43.7	SW	4	W	3	0.15	cu								10.9			10		
11	28.98		29.10		58.0	44.7	74.8	38.0	53.9	48.4	43.6	42.0	W	3	W	0.2	0.01	cu								8.9			11		
12	29.01		28.83		58.2	31.7	77.0	29.2	42.0	40.8	50.2	48.5	SW	0	SW	0.5	0	cu								7.8			12		
13	28.70		28.73		57.0	45.0	67.0	42.9	50.1	49.2	45.0	42.9	E	0.2	SW	0.5	0.09	cu								10.10			13		
14	28.71		28.66		52.7	42.8	71.1	38.2	46.1	44.0	43.2	42.3	W	0	W	0	0.03	cu								9.8			14		
15	28.56		28.60		56.1	38.6	70.1	33.4	44.4	43.9	43.2	42.6	SW	0	SW	0.2	0	cu								7.8	Fog		15		
16	28.73		28.86		51.9	42.0	65.3	37.8	44.9	44.7	44.6	45.0	W	0	E	0.5	0.04	cu								6.9			16		
17	28.89		28.84		53.3	35.8	60.8	31.7	42.0	41.0	46.8	44.6	SW	0	SW	0	0.11	cu								8.8			17		
18	28.74		28.64		51.4	43.2	65.3	41.4	48.3	46.1	47.0	45.4	SW	0.2	SW	1	0.04	cu								9.9			18		
19	28.65		28.67		53.1	43.1	68.3	38.8	48.7	45.8	43.8	41.6	W	0	SW	0.5	0	cu								9.10			19		
20	28.58		28.38		50.0	42.8	52.0	39.0	46.3	44.6	47.0	45.8	SW	0	SW	1.5	0.03	cu								9.8			20		
21	28.21		28.03		53.4	38.0	70.0	32.5	46.2	44.2	38.0	37.0	SW	0.5	SW	0	0.30	cu								10.8			21		
22	28.05		28.36		49.4	29.2	55.8	25.7	45.0	42.2	43.9	42.3	SW	0	SW	1	0	cu								7.9			22		
23	28.44		28.39		57.8	33.2	62.8	29.8	37.7	36.6	52.7	51.4	W	0	SW	0.2	0.18	cu								8.9			23		
24	28.44		28.50		60.3	52.0	67.1	50.3	56.9	53.8	63.1	63.4	SW	1	SW	1	0.10	cu								10.10			24		
25	28.46		28.36		58.8	49.1	65.2	47.0	56.2	53.1	49.1	47.2	SW	1	SW	1	0.09	cu								9.10		Aurora Borealis	25		
26	28.46		28.63		55.6	46.2	66.2	43.0	50.8	48.1	46.0	44.0	SW	1	SW	1.5	0.28	cu								10.8		Thunder Lightning	26		
27	28.77		28.80		56.0	48.2	72.7	33.5	46.8	44.0	43.9	42.6	SW	0.2	W	0.5	0	cu								10.8			27		
28	28.58		28.34		52.9	41.0	63.0	36.0	51.1	43.6	49.2	48.0	SW	0.2	SW	1.5	0.02	cu								10.8			28		
29	28.14		28.27		52.4	45.0	65.8	41.0	46.9	45.0	45.0	43.0	SW	1	SW	1	0.32	cu								10.9			29		
30	28.44		28.56		52.3	44.0	71.0	41.0	50.0	46.3	47.9	46.4	SW	1	SW	1	0.04	cu								10.8			30		
31																													31		
Sums.	856.69		857.67		1617.6	1274.2	1980.4	1165.6	146.1	1390.5	1408.3	1353.1	18.0		28.8	24.50	2.0									267.262					
Means.	28.536		28.589		54.9	42.4	66.0	38.8	48.7	46.3	46.9	45.1	0.60		0.96		7.0									8.987					
Index Errors.	-.009		-.009		-.1	+.2	-.1	-.1	-.1	-.1	-.1	-.1																			
Correc- tion for Diurnal Range.	-.011		-.009		-.1.3				-.4	-.8	+.8	+.4					-.8														
Corrected Means.	28.536		28.571		54.9	42.5	66.2	38.7	48.3	45.4	48.5	45.4	0.60		0.96	24.50	6.2									8.987					
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				
Barometer, mean corrected reading of Column No. 1 (A.M.) = 28.536																															

Barometer, mean corrected reading of Column No. 1 (A.M.).....= 28.536 Column No. 3 (P.M.).....= 28.571
Diameter of tube _____ inch; correction for capillarity to be added.....+ 0.07 Capillarity.....= + 0.07
Sum..... 28.549 Sum..... 28.578
Correction for Temperature from Column No. 3 to be deducted.....= 0.050 Temp. from Col. 3.....= 0.47
Sum..... 28.499 Sum..... 28.531

Mean of the above 28.515
Correction for Height above Sea-level, 1110 feet, to add..... 1.250
Barometer corrected and reduced to 32° and Sea-level, 29.765

Dry bulb Thermometer (mean of Cols. 9 and 11),*..... 48.4
Wet bulb Thermometer (mean of Cols. 10 and 12),*..... 45.4
† Dew-point Temperature.....
† Elastic Force of Vapour.....
† Weight of Vapour in a Cubic Foot of Air.....
† Additional Weight required to Saturate a Cubic Foot.....
† Degree of Humidity (Saturation 100).....

Highest Reading Self-Registering Thermometer in Air and Protected, 63.3 on the 7th
Lowest do. do. do. 29.2 on the 22nd
Difference, being Monthly Range, 34.1
Mean of Self-Registering Thermometers in Air and Protected, 47.4
Mean Daily Range in Air and Protected, 12.1
Greatest Daily Range, do., 26.5 on the 10th
Highest Reading Self-Registering Black Bulb Thermometer in Sun, 85.0 on the 7th
Lowest do. do. do. 25.7 on the 22nd

SUMMARY OF THE WINDS.											
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	4	7	4	—	13	0.60	0.22
P.M.	1	2	3	1	4	7	2	—	3	0.96	0.30
Mean.	$\frac{1}{2}$	2	2 $\frac{1}{2}$	1	4	7	3	—	8	0.78	0.26

(Signed) James Cameron M.A.
(Designation) Mr. Fraser

the Month, with the Sums correctly added, and the Means deduced. No Wax or Waxes ever to be employed in closing the Schedule—the Gummed Corner to be alone used.

7.8
62.4
54.6
6.084

INSTRUCTIONS FOR MAKING METEOROLOGICAL OBSERVATIONS.

Those persons who kindly furnish Monthly Tables of the Weather to the Scottish Meteorological Society are requested to attend to the following Instructions, seeing that one of the most important ends of Meteorological Observations is their being comparable with one another, and for this purpose it is requisite that all should, if possible, observe at a like hour, and in a like manner, and have their instruments placed, in so far as circumstances allow, in a like position:

Hour of Observation.—All instruments which are observed twice a-day, should be read at the same hour morning and evening, in order to furnish mean results. The Society recommends a quarter before nine o'clock, morning and evening, as the most convenient hour; but should this be inconvenient for the observer, another hour may be chosen, attending, however, to the above rule, that the evening and morning readings be taken at the same hour, and this hour entered on the Schedule.

Barometer.—Barometers of Messrs Adie and Son's construction are recommended; but any instruments may be used which have adjustable surfaces, and have been compared. Before this instrument is suspended for use it should be examined, in order to ascertain whether the space above the mercury is free from air. This is done by inclining the instrument somewhat from the vertical position, when, if free from air, the mercury will settle against the upper end of the tube with a sharp top. The mercury should then completely fill the tube. If any air has got admittance, it should be driven into the cistern by reversing the instrument, and tapping it gently with the hand. If it cannot be thus expelled, the instrument is useless till repaired.

The Barometer should be hung in a good light, and perfectly perpendicular, as ascertained by the plumb line; and it ought always to be gently tapped before taking the reading, to prevent adhesion of the mercury to the tube. In reading, the eye ought to be placed on the exact level of the top of the column of mercury. The reading of the attached Thermometer ought always to be the first taken, as the heat of the breath, or the proximity of the person, are apt to influence its readings.

The corrections necessary to be applied to the Barometric readings depend on the form of the instrument. The mode of making these corrections, and the tables employed for the purpose, will be found in the "Report of the Committee of the Royal Society on Physics and Meteorology," 1840, price 1s. The daily readings of the Barometer ought to be entered on the Schedule as read off, and the corrections only applied to the mean for the month. *Self-Registering Thermometers and Hygrometers.*—These should be placed alongside of each other, in a place freely exposed to the air, but protected from sunning, and from reflected heat, as well as from radiation and from rain, and as near as may be four feet from the general surface of the ground. Different contrivances are used for this purpose, either a double ventilated box with louver-boarded sides, fixed at a north window, and projecting 12 inches from the wall, so as to allow a free current of air to pass between the box and the wall; or in a double meat-safe ventilated box with louver-boarded sides, fixed in an exposed place, and if possible over grass. Whatever means are finally decided on, the position of the instruments should be mentioned, and should not be changed (without due notice being given to the Secretary), in order that the results of one month's observations may be strictly comparable with those of another.

The Self-Registering Thermometers should be placed exactly horizontal. In the case of the ordinary maximum Thermometer, with clay, glass, or steel index, the bulb may be very slightly elevated, in order that the mercurial column may be somewhat aided by the force of gravity in pushing forward the float or index; and in the case of the minimum Thermometer, the bulb must be slightly depressed, to prevent a draining of the spirit to the top of the tube, and also that any part raised in vapour may return to the column. These Thermometers, if read once a-day, should always be read on the evening, so that the temperatures marked by the floats indicate the minimum and the maximum of the day on which the reading is taken. N.B.—The readings of these instruments are taken from that extremity of the float which is nearest the head of the column of mercury or of spirit.

The maximum Registering Thermometer, for taking the extreme heat of the sun's rays, should have its bulb blackened and the surface pendent dull, and it should be mounted in a black-enamelled box, whose sides should be so high as to protect the bulb from wind. It should be so placed that the sun's rays have free access to it during the heat of the day.

The minimum Registering Thermometer, for ascertaining the lowest temperature during the night from radiation, should have its bulb similarly blackened and rendered dull, and be similarly mounted. It should be laid out, about sunset, over grass, in a place freely exposed to the sky, but raised on wooden supports a few inches above the surface, and removed during the day.

Hygrometer.—The wet bulb requires the muslin covering it to be often changed. In towns once a month, or oftener, if the weather is dusty, and the muslin gets foul; in the country whenever the muslin seems to be foul. The muslin should always be thoroughly wetted, and freed from starch, before being used; and the cotton wick which conducts moisture to it should be thoroughly wetted, else it will conduct the moisture imperfectly, and yield false results. The cotton wick is best attached by passing its extremity through an aperture in the centre of the muslin, spreading that portion out so as to apply equally round the bulb, and then tying the muslin over the bulb. In frosty weather, water must be poured over the wet bulb, so as to form a thin film of ice on the muslin, the evaporation from the ice going on as from the simply wetted bulb.

Rain Gauge.—As "Plowing's Rain Gauge" seems to possess several advantages over others, the Society gives the preference to them; but whatever form be employed, in order that all the stations may yield comparable results, it is recommended that the Gauge be sunk in the ground, so that the top of the receiver is nearly on a level with the top blades of close cut grass, in a place as distant as possible from trees, hedges, high walls, and irregular or broken ground, and the quantity of Rain, should, if possible, be registered daily. When more than one Rain Gauge is kept, they ought to be placed near each other, but at different heights above the ground, and their indications noted in the general remarks, mentioning their height above ground—the regular column in the Schedule being reserved for the ground Rain Gauge alone.

Winds.—Isolated Wind-vanes or Weather-cocks are apt to give false indications of the general direction of the wind, in consequence of the currents of air at the surface of the ground being so much influenced by the neighbourhood of hills, valleys, buildings, etc. Where low clouds are seen drifting along, their direction in reference to known objects, or as noted by means of a mirror fixed over the centre of a pocket compass, will, in general, give the true direction of the current of air near the earth's surface if these clouds are near and immediately overhead, that is, in or near the zenith of the observer. The notion of the higher strata of clouds gives no such indication. Failing this, the general direction of the smoke of a hearth or village, or of tall chimneys, gives a better indication of the general direction of the wind than any wind-vane. The observer should state whether he has ascertained the direction by reflection or otherwise. For mode of estimating the force of the wind, see "Directions for Reading Instruments." Lind's Anemometer is commonly used for this purpose, but the best Anemometer of moderate price yet invented is Professor Robinson's Cup Wind Gauge, which registers the velocity of the wind—540 revolutions of the cups, as registered by the instrument, being equal to one statute mile.

Clouds.—The Society recommends observers to adopt the Howard nomenclature of clouds. The scale of cloud in the visible sky is reckoned from 0 to 10. Thus, a sky quite free from cloud is 0; a sky half covered with cloud is 5; and the whole visible sky covered with cloud is 10. Clouds often cover three-fourths or even more of the visible sky without obstructing the sunning, so that the indications noted in the column for clouds would not necessarily express, or agree with, the column for sunning. As the full moon, so long as it is above the horizon, is thought by some eminent astronomers to have a powerful effect in dissipating clouds, it would be well to note in the General Remarks any facts bearing on this point, for a few days (or nights, as the case may be) before and after every full moon; and the same observations ought to be made at the periods of new moon.

Sunning.—The number of hours the sun shines during the day should be entered in the proper column.

Thermometers under Ground.—Though the temperature and hygrometric conditions of the air are those which chiefly influence the growth of crops, it is important for the health of the crop, and for the germination of the seed, that the soil itself should have a certain temperature. To collect facts which may illustrate this, it is recommended to have Thermometers sunk 6, 12, and 22 inches below the surface of the ground, to ascertain the temperature of what may be termed the agricultural soil; and the observer should enter in the Schedule the kind of soil; whether drained or undrained; and whether naturally wet or dry.

Temperature of the Sea.—As the meteorology of the island is incomplete without a knowledge of the mean temperature of the Ocean which surrounds it, the Society strongly recommends taking the temperature of the Sea at a depth of 6 feet or 1 fathom from the end of all piers or rocks round the coast, where free from the influence of river water, and as near as may be about the time of high water. A Thermometer, with its bulb fixed in a small tin pichety covered with a sloping lid, and with a weight attached, is sunk to the required depth, and in ten minutes drawn up and read. The density of the sea water should, if possible, be taken at the same time. Convenient instruments are furnished by Messrs Adie and Son.

Temperature of Springs.—The temperature of Springs or Deep Wells is recommended to be taken whenever practicable, mentioning whether Spring or Well, and its depth from the surface. *Measurings.* Above Deep Wells, *Removable Depression or Elevation of Barometer*, *Removable Falls of Rain*, *Ural or Snow*, *Thunder and Lightning*, etc., should be specially noticed, together with the exact hour at which they were first seen, their continuance, and direction.

Birding, Leafing, and Flooding of Trees.—It is necessary to bear in mind that varieties of the same species of tree differ widely in their times of leafing and flowering. *Individual Trees* or *Shrubs* of each kind should therefore be chosen (if possible) early kinds, and their indications should be alone noted—always the same plant from year to year being noticed.

Ozone.—Mention whether Schombert's or Moffit's scale and papers are used. Schombert's are preferred. They may be had at Messrs Adie and Son's, 50, Princess Street, and at Mr Bryson's, 60, Pines Street, Edinburgh.

Electricity.—Pith balls suspended by a linen thread, in connection with a metallic conductor, and under cover, and the degree of a circle being used to express the degree of repulsion, form a cheap and convenient Electrometer. Excised glass or sealing-wax ascertains the nature of the electricity.

SHRUBS, ETC.		FRUITS.		MICHAELMAS BIRDS.		Other Birds, naming them—	
First in Blossom.		First in Blossom.		First in Blossom.			
Barberry,.....		Apple,.....		Cuckoo,.....			
Bourtree or Elder,.....		Black Currant,.....		Curlew,.....			
Broom,.....		Cherry,.....		House-Swallow,.....			
Hazel,.....		Gooseberry,.....		Lapwing,.....			
Hawthorn,.....				Plover,.....			
Holly,.....				Sand-Martin,.....			
Laburnum,.....				Starling,.....			
Lilac,.....				Swan,.....			
Mezeron,.....				Rail or Corn Crake,.....			
Mountain Ash or Rowan,.....							
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., whether plentiful, or in perfection; whether any have suffered from blight, disease, etc. Whether Epizootic disease prevails among Cattle; and the agricultural condition of the district generally.

OBSERVATIONS IN CONNECTION WITH THE PERIODICAL RETURN OF THE SEASONS.

FOREST TREES.		CROPS.		Other Crops, naming them—		First Cut	
In Flower.		In Leaf.		In Ear.			
Alder,.....							
Ash,.....							
Beech,.....							
Birch,.....							
Elm,.....							
Larch,.....							
Lime,.....							
Oak,.....							
Sycamore or Plane,.....							

DR STARK,

Sec., Meteorological Society,

21, Rutland Street,

EDINBURGH.

METEOROLOGICAL RETURNS.

SEPTEMBER 1859

To

Burgess

59
28
EX

INSTRUCTIONS FOR MAKING METEOROLOGICAL OBSERVATIONS.

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Barometer.—Barometers of Messrs. Adie and Son's construction are recommended; but any instruments may be used which have adjustable surfaces, and have been compared. Before this instrument is suspended for use it should be examined, in order to ascertain whether the space above the mercury is free from air. This is done by inclining the instrument somewhat from the vertical position, when, if free from air, the mercury will strike against the upper end of the tube with a sharp tap. The mercury should then completely fill the tube. If any air has got admittance, it should be driven into the cistern by reversing the instrument, and tapping it gently with the hand. If it cannot be thus expelled, the instrument is useless till repaired.

The Barometer should be hung in a good light, and perfectly perpendicular, as ascertained by the plumb line; and it ought always to be gently tapped before taking the reading, to prevent adhesion of the mercury to the tube. In reading the eye ought to be placed on the exact level of the top of the column of mercury. The reading of the attached Thermometer ought always to be the first taken, as the heat of the breath, or the proximity of the person, are apt to influence its readings.

The corrections necessary to be applied to the Barometric readings depend on the form of the instrument. The mode of making these corrections, and the tables employed for the purpose, will be found in the 4th Report of the Committee of the Royal Society on Physics and Meteorology, 1840, page 18. The daily readings of the Barometer ought to be entered on the Schedule as read off, and the corrections only applied to the mean for the month.

Self-Registering Thermometer and Hygrometer.—These should be placed alongside of each other, in a place freely exposed to the air, but protected from sunshine, and from reflected heat, as well as from radiation and from rain, and as a screen as may be seen from the general surface of the ground. Different contrivances are used for this purpose, either a double ventilated box with louver-boarded sides, fixed at a north window, and projecting 12 inches from the wall, so as to allow a free current of air to pass between the box and the wall; or in a double-necked ventilated box with louver-boarded sides, fixed in an exposed place, and if possible over grass. Whatever means are finally decided on, the position of the instruments should be mentioned, and should not be changed (without due notice being given to the Secretary), in order that the results of one month's observations may be strictly comparable with those of another.

The *Self-Registering Thermometers* should be placed exactly horizontal. In the case of the ordinary maximum Thermometer, with clay glass, or steel index, the bulb may be very slightly elevated, in order that the mercurial column may be somewhat aided by the force of gravity in pushing forward the float or index; and in the case of the minimum Thermometer, the bulb must be slightly depressed, to prevent a draining of the spirit to the top of the tube, and also that any part raised in vapour may return to the column. These Thermometers, if read once a-day, should always be read on the evenings, so that the temperatures marked by the floats indicate the minimum and the maximum of the day on which the reading is taken. N.B.—The readings of these instruments are taken from the extremity of the float which is nearest the head of the column of mercury or of spirit.

The maximum Registering Thermometer, for taking the extreme heat of the sun's rays, should have its bulb blackened and the surface rendered dull, and it should be mounted in a blackened box, whose sides should be so high as to protect the bulb from wind. It should be so placed that the sun's rays have free access to it during the heat of the day.

The minimum Registering Thermometer, for ascertaining the lowest temperature during the night from radiation, should have its bulb similarly blackened and rendered dull, and be similarly mounted. It should be laid out, about sunset, over grass, in a place freely exposed to the sky, but raised on wooden supports a few inches above the surface, and removed during the day.

Hygrometer.—The wet bulb requires the muslin covering it to be often changed. In towns once a month, or oftener, if the weather is dusty, and the muslin gets foul; in the country always be thoroughly wetted, and freed from stretch, before being used; and the cotton wick which conducts moisture to it should be thoroughly wetted, also it will conduct the moisture more perfectly, and yield false results. The cotton wick is best attached by passing its extremity through an aperture in the centre of the muslin, spreading that portion out so as to apply equally round the bulb, and then tying the muslin over the bulb. In frosty weather, great care must be taken over the wet bulb, so as to form a thin film of ice on the muslin, the exposure from the ice going on as from the simply wetted bulb.

Rain Gauge.—As "Fleming's Rain Gauge" seems to possess several advantages over others, the Society gives the preference to them; but whenever form be employed, in order that all the stations may yield comparable results, it is recommended that the Gauge be sunk in the ground, so that the top of the receiver is nearly on a level with the top blades of low grass, in a place as distant as possible from trees, houses, high walls, and irregular or broken ground, and the quantity of Rain, snow, or possible, be registered daily. When more than one Rain Gauge is kept, they ought to be placed near each other, but at different heights above the ground, and their indications noted in the general remarks, mentioning their height above ground—the regular column in the Schedule being reserved for the ground Rain Gauge alone.

Winds.—Isolated Wind-vanes or Weather-cocks are apt to give false indications of the general direction of the wind, in consequence of the currents of air at the surface of the ground being so much influenced by the neighbourhood of hills, valleys, buildings, etc. Where low clouds are seen drifting along, their direction in reference to known objects, or as noted by means of a mirror fixed over the centre of a pocket compass, will, in general, give the true direction of the current of air near the earth's surface; if these clouds are near and immediately overhead, that is, in or near the zenith of the observer. The motion of the higher strata of clouds gives no such indication. Filling the clouds, the general direction of the smoke of a hamlet or village, or of a tall chimney, gives a better indication of the general direction of the wind than any wind-vane. The observer should state whether he has ascertained the direction by reflection or otherwise. For mode of estimating the force of the wind, see "Directions for Reading Instruments." Lind's Anemometer is commonly used for this purpose, but the best Anemometer of moderate price yet invented is Professor Robinson's Cup Wind Gauge, which registers the velocity of the wind, 340 revolutions of the cups, as registered by the instrument, being equal to one statute mile.

Clouds.—The Society recommends observers to adopt the Howard nomenclature of clouds. The scale of cloud in the visible sky is reckoned from 0 to 10. Thus a sky quite free from cloud is 0; a sky half covered with cloud is 5; and the whole visible sky covered with cloud is 10. Clouds often cover three-fourths or even more of the visible sky without obstructing the sunshine, so that the indications noted in the column for clouds would not necessarily express, or agree with, the column for sunshine. As the full moon, so long as it is above the horizon, is thought by some eminent astronomers to have a powerful effect in dispelling clouds, it would be well to note in the General Remarks any facts bearing on this point, for a few days (or nights, as the case may be) before and after every full moon; and the same observations ought to be made at the periods of new moon.

Sunshine.—The number of hours the sun shines during the day should be entered in the proper column.

Thermometers under Ground.—Though the temperature and hygrometric conditions of the air are those which chiefly influence the growth of crops, it is important for the health of the crop, and for the germination of the seed, that the soil itself should have a certain temperature. To collect facts which may illustrate this, it is recommended to have 4 thermometers sunk 3, 12, and 22 inches below the surface of the ground, to ascertain the temperature of what may be termed the kind of soil; whether drained or undrained; and whether naturally wet or dry.

Temperature of the Sea.—As the meteorology of the island is incomplete without a knowledge of the mean temperature of the Ocean which surrounds it, the Society strongly recommends taking the temperature of the Sea at a depth of 6 feet or 1 fathom from the end of all piers or rocks round the coast, where free from the influence of river water, and as near as may be about the time of high water. A Thermometer, with its bulb fixed in a small tin pichet, covered with a sloping lid, and with a weight attached, is sunk to the required depth, and in ten minutes drawn up and read. The density of the sea water should, if possible, be taken at the same time. Convenient instruments are furnished by Messrs Adie and Son.

Temperature of Springs.—The temperature of Springs or Deep Wells is recommended to be taken whenever practicable, mentioning whether Spring or Well, and its depth from the surface. *Notes, Aurora Borealis, Remarkable Discoloration or Elevation of Barometer, Remarkable Falls of Rain, Hail or Snow, Thunder and Lightning, etc.*, should be specially noticed, together with the exact hour at which they were first seen, their continuance, and direction.

Budding, Leafing, and Flowering of Trees.—It is necessary to bear in mind that varieties of the same species of tree differ widely in their times of leafing and flowering. *Individual Trees or Shrubs of each kind should therefore be chosen (if possible early kinds), and their indications should be alone noted—always the same plant from year to year being noticed.*

Crops.—Mention whether Schonben's or Moffat's scale and papers are used. Schonben's are preferred. They may be had at Messrs Adie and Son's, 50, Princes Street, and at Mr Bryson's, 60, Princes Street, Edinburgh.

Electricity.—Pith balls suspended by a linen thread, in connection with a metallic conductor, and under cover, and the degree of a circle being used to express the degree of repulsion, form a cheap and convenient Electrometer. Excited glass or sealing-wax ascertains the nature of the electricity.

SHRUBS, ETC.		FRUITS.		MIGRATORY BIRDS.	
First in Blossom.	First in Blossom.	First in Blossom.	First in Blossom.	First in Blossom.	First in Blossom.
Barberry,	Apple,	Cuckoo,	Curlew,	House-Swallow,	Lapwing,
Broom,	Cherry,	Swain,	Starling,	Other Birds, naming them	Other Birds, naming them
Bourtree or Elder,	Black Currant,	Swain,	Starling,	Other Birds, naming them	Other Birds, naming them
Hawthorn,	Gooseberry,	Swain,	Starling,	Other Birds, naming them	Other Birds, naming them
Holly,	Peach,	Swain,	Starling,	Other Birds, naming them	Other Birds, naming them
Laburnum,	Pear,	Swain,	Starling,	Other Birds, naming them	Other Birds, naming them
Lilac,	Plum,	Swain,	Starling,	Other Birds, naming them	Other Birds, naming them
Mezereon,	Strawberry,	Swain,	Starling,	Other Birds, naming them	Other Birds, naming them
Mountain Ash or Rowan, .....	.....	Swain,	Starling,	Other Birds, naming them	Other Birds, naming them
Red Flowering Currant, .....	.....	Swain,	Starling,	Other Birds, naming them	Other Birds, naming them
Rhododendron Ponticum, .....	.....	Swain,	Starling,	Other Birds, naming them	Other Birds, naming them
Whin, .....	.....	Swain,	Starling,	Other Birds, naming them	Other Birds, naming them

FOREST TREES.		CROPS.		MIGRATORY BIRDS.	
In Flower.	In Leaf.	Planted.	Planted.	First in Blossom.	First in Blossom.
Alder,	Barley,	Barley,	Barley,	Swain,	Starling,
Ash,	Beech,	Barley,	Barley,	Swain,	Starling,
Birch, .....	.....	Barley,	Barley,	Swain,	Starling,
Elm, .....	.....	Barley,	Barley,	Swain,	Starling,
Larch, .....	.....	Barley,	Barley,	Swain,	Starling,
Lime, .....	.....	Barley,	Barley,	Swain,	Starling,
Oak, .....	.....	Barley,	Barley,	Swain,	Starling,
Sycamore or Plane, .....	.....	Barley,	Barley,	Swain,	Starling,

OBSERVATIONS IN CONNECTION WITH THE PERIODICAL RETURN OF THE SEASONS.

OCTOBER 1859

DR STARK,

Sec. Meteorological Society,

21, Rutland Street,

EDINBURGH.

METEOROLOGICAL RETURNS.

To

M. Burgess

10 St Andrew Lane

SCOTTISH METEOROLOGICAL SOCIETY.

Observations taken at Præmar, County of Shroton, in Lat. 57° 4', Long. 2° 24' W, Height above Sea 1110 feet.

Distance from Sea 40 miles. During the MONTH of November 1859.

Days of Month.	BAROMETER.				SELF-REGISTERING THERMOMETERS.				HYGROMETER.				WIND.				RAIN.		CLOUD.	SUNSHINE.	THERMOMETERS, under Ground.				SEA.		ELECTRICITY.	GENERAL REMARKS. As to occurrence of Thunder, Lightning, Storms, Hail, Meteors, Remarkable Depression or Elevation of Barometer, etc. Mention the hour at which these began and ended.	Days of Month.	
	9 ^h . A.M.		9 ^h . P.M.		PROTECTED.		EXPOSED.		9 ^h . A.M.		9 ^h . P.M.		9 ^h . A.M.		9 ^h . P.M.		Days on which it fell.	Amount.			— 1 ^h . A.M.			Temperature of SPRING or WELL.	Temperature.	Density.				OZONE. 0 to 10
	Barometer.	Attach- ed Ther- mometer.	Barometer.	Attach- ed Ther- mometer.	Highest in Air.	Lowest in Air.	Max. Black bulb in Sun.	Min. Black bulb during Night.	Dry bulb.	Wet bulb.	Dry bulb.	Wet bulb.	Direction.	Force ↑↑	Direction.	Force ↑↑					3 inches.	12 inches.	22 inches.							
1	27.47		28.06		37.6	31.0	37.7	30.3	35.7	35.7	36.1	34.0	N	1	N	4		2.310							10	10		1		
2	28.37		28.32		38.6	30.5	41.9	26.5	30.9	29.8	38.0	36.6	NW	0.2	SW	0.2		2.190							9	9		2		
3	28.23		28.26		41.9	30.6	32.3	30.6	32.3	34.1	37.1	35.8	S	0.5	SW	0.5		2.020							10	10		3		
4	28.46		27.86		40.2	30.6	43.0	31.8	35.8	34.3	36.7	36.0	NW	0.5	SW	1		2.040							10	9		4		
5	27.41		27.64		42.2	33.3	50.4	32.0	36.0	33.7	33.2	33.0	SW	1	SW	1		2.240							10	9		5		
6	27.75		27.79		46.6	33.1	48.9	32.1	42.3	40.8	44.2	42.2	SW	0.2	SW	1.5		2.310							10	10		6		
7	28.01		28.10		46.8	32.0	46.8	29.0	34.7	32.6	33.0	31.9	N	1.5	SW	1		2.370							10	10	Lightning Show	7		
8	28.26		28.74		38.1	32.1	40.0	29.8	35.1	34.0	32.2	30.2	N	1	N	1.5		2.310							10	10	Snow	8		
9	29.12		29.40		33.1	28.0	43.1	23.0	31.7	30.3	28.9	28.4	NW	1	NE	0.2		2.120							9	9	do	9		
10	29.46		29.43		30.8	20.8	38.8	19.0	20.8	20.8	27.0	26.3	N	0	N	0		2.010							9	8		10		
11	29.35		29.23		39.0	26.3	46.0	26.2	31.8	31.0	38.0	36.1	SW	0.2	SW	0.2		2.000							8	9		11		
12	29.19		29.04		42.2	33.1	53.2	29.3	34.0	31.4	42.0	39.9	N	0	SW	0.5		2.000							8	8		12		
13	29.07		29.10		46.1	36.2	58.0	32.0	41.1	40.0	36.2	35.8	SW	1.5	SW	0		2.060							9	9		13		
14	29.13		29.45		39.8	26.2	35.0	22.8	27.3	27.0	26.2	25.9	SW	0	SW	0		2.000							8	7	Overcast	14		
15	29.22		29.28		39.5	27.2	40.6	21.5	31.8	30.8	30.0	29.7	SW	0	SW	0		2.000							8	7		15		
16	29.26		29.16		35.0	27.0	41.6	23.9	28.1	28.1	33.0	32.8	SW	0	SW	0.2		2.000							7	6		16		
17	29.01		28.86		37.4	31.7	38.2	31.2	36.2	34.3	36.8	35.6	SW	0	SW	1.5		2.030							10	10		17		
18	28.71		28.79		45.9	36.3	46.2	35.2	42.3	42.2	29.8	29.0	SW	0.2	SW	1		2.020							10	10		18		
19	28.86		28.86		41.4	34.6	41.4	29.5	36.3	35.2	36.6	33.7	SW	0.2	N	0		2.020							10	9		19		
20	28.81		28.66		41.8	33.3	42.1	27.2	41.2	40.6	26.3	23.0	SW	0	S	0		2.020							10	8		20		
21	28.46		28.39		44.2	22.0	52.0	22.0	22.0	22.0	44.0	42.0	SW	0	SW	0.5		2.000							7	9		21		
22	28.64		28.81		49.3	28.0	52.1	25.0	36.0	36.0	30.4	29.8	N	1	S	0		2.110							10	8		22		
23	28.90		28.91		37.6	25.5	41.0	20.5	24.6	27.1	26.0	25.6	SW	0	SW	0		2.000							5	4		23		
24	28.94		28.94		42.6	25.6	42.6	21.0	30.0	24.3	40.0	38.2	SW	0	SW	0.2		2.010							5	4	Fog	24		
25	28.88		28.75		42.3	38.5	43.3	31.0	42.0	40.4	39.0	37.5	SW	0.5	SW	1		2.050							10	10	do	25		
26	28.57		28.30		41.8	38.0	41.8	35.0	38.8	38.0	41.0	40.4	SW	0.5	SW	0.5		2.040							10	9	do	26		
27	28.50		28.60		42.3	33.2	46.1	27.0	38.8	35.8	33.2	32.0	N	0.5	SW	0.5		2.070							10	10		27		
28	28.54		28.44		38.4	28.0	45.7	21.8	31.7	30.1	32.5	31.9	SW	0	SW	0.5		2.010							9	9		28		
29	28.48		28.53		35.2	29.0	35.3	26.0	33.5	32.7	29.9	29.0	N	1	N	0.5		2.030							10	9	Snow	29		
30	28.57		28.60		35.8	29.2	42.2	26.7	32.4	32.0	33.2	33.2	SW	0.5	N	0.5		2.060							9	10	do	30		
31																												31		
Sums.	888.82		860.02		1214.6	916.4	1357.3	814.9	107.57	492.2	1018.6	1015.3	12.7		18.5	23	4780	212.2								270.364				
Means.	28.627		28.667		40.4	30.5	45.2	27.1	34.1	33.0	34.9	33.8	0.42		0.61	19	7.0									9.088				
Index Errors.	-.009		-.009		-	+1.1	+2.1	-.1	-	-.1	-	-.1														8.9 ± Mean				
Correction for Diurnal Range.	-.010		-.009						34.1	32.9	34.9	33.7					-1													
Corrected Means.	28.608		28.649		40.4	30.6	45.4	27.0	35.0	33.5	35.5	33.8	0.42		0.61	19	6.9									8.9				
No. of Column.	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27			

Barometer, mean corrected reading of Column No. 1 (A.M.),.....= 28.608 Column No. 3 (P.M.),.....= 28.649
Diameter of tube 0.4 inch; correction for capillarity to be added,.....+ 7 Capillarity,.....= + 7
Sum,.....= 28.615 Sum,.....= 28.656
Correction for Temperature from Column No. 2 to be deducted,.....= 0.17 Temp. from Col. 4,.....= 0.17
Sum,.....= 28.598 Sum,.....= 28.639

Mean of the above 28.618
Correction for Height above Sea-level, 1110 feet, to add,..... 1.289
Barometer corrected and reduced to 32° and Sea-level, 29.887

Dry bulb Thermometer (mean of Cols. 9 and 11),*..... 34.5
Wet bulb Thermometer (mean of Cols. 10 and 12),*..... 33.3
† Dew-point Temperature,..... 31.2
† Elastic Force,..... 1.745
† Weight of Vapour in a Cubic Foot of Air,.....
† Additional Weight required to Saturate a Cubic Foot,.....
† Degree of Humidity (Saturation 100),..... 82

Highest Reading Self-Registering Thermometer in Air and Protected,..... 49.3 on the 25
Lowest do. do. do.,..... 20.8 on the 10
Difference, being Monthly Range,..... 28.5
Mean of Self-Registering Thermometers in Air and Protected,..... 33.5
Mean Daily Range in Air and Protected,..... 9.8
Greatest Daily Range, do.,..... 22.2 on the 24
Highest Reading Self-Registering Black Bulb Thermometer in Sun,..... 58.0 on the 13
Lowest do. do. from Radiation during Night,..... 19.0 on the 10

SUMMARY OF THE WINDS.											
Direction.	N	NE	E	SE	S	SW	W	NW	Calm or Variable.	Mean Force.	Mean Velocity in miles per day.
A.M.	2	0	-	1	2	16	7	2	4	0.42	17
P.M.	5	2	-	0	3	19	1	0	8	0.61	24
Mean.	3	1	-	1	2	18	4	1	9	0.51	20

(Signed) H. James Cameron

(Designation) The Observer

Force of the Wind, may be entered the number of revolutions, by Professor Robinson's Cup
Wind—540 revolutions being equal to one statute mile.
Readings to be alone taken to account, as the correction for Diurnal Range in Scotland is
Tables, Second Edition only.

(to be paid) as early as possible after the completion of the Month, with the Sums correctly added, and the Means deduced. No Wax or Wafers ever to be employed in closing the Schedule—the Gummed Corner to be alone used.

INSTRUCTIONS FOR MAKING METEOROLOGICAL OBSERVATIONS.

Those persons who kindly furnish Monthly Tables of the Weather to the Scottish Meteorological Society are requested to attend to the following Instructions, seeing that one of the most important ends of Meteorological Observations is their being comparable with one another; and for this purpose it is requisite that all should, if possible, observe at a like hour, and in a like manner, and have their instruments placed, in so far as circumstances allow, in a like position:

Hour of Observation.—All instruments which are observed twice a-day should be read at the same hour morning and evening, in order to furnish mean results. The Society recommends a quarter before nine o'clock morning and evening, as the most convenient hour; but should this be inconvenient for the observer, another hour may be chosen, attending, however, to the above rule, that the evening and morning readings be taken at the same hour, and this hour entered on the Schedule.

Barometer.—Barometers of Messrs. Adie and Son's construction are recommended; but any instruments may be used which have adjustable surfaces, and have been compared. Before this instrument is suspended for use it should be examined, in order to ascertain whether the space above the mercury is free from air. This is done by inclining the instrument somewhat from the vertical position, when, if free from air, the mercury will strike against the upper end of the tube with a sharp tap. The mercury should then completely fill the tube. If any air has got admittance, it should be driven into the cistern by reversing the instrument, and tapping it gently with the hand. If it cannot be thus expelled, the instrument is useless till repaired.

The barometer should be hung in a good light, and perfectly perpendicular, as ascertained by the plumb line; and it ought always to be gently tapped before taking the reading, to prevent adhesion of the mercury to the tube. In reading, the eye ought to be placed on the exact level of the top of the column of mercury. The reading of the attached thermometer ought always to be the first taken, as the heat of the breath, or the proximity of the person, are apt to influence its readings.

The corrections necessary to be applied to the Barometric readings depend on the form of the instrument. The mode of making these corrections, and the tables employed for the purpose, will be found in the Report of the Committee of the Royal Society on Physics and Meteorology, 1850, price 1s. The daily readings of the barometer ought to be entered on the Schedule as read off, and the corrections only applied to the mean for the month. *Self-registering Thermometers and Hygrometers.*—These should be placed alongside of each other, in a place freely exposed to the air, but protected from sunbaking and from reflected heat, as well as from radiation and from rain, and as near as may be four feet from the general surface of the ground. Different contrivances are used for this purpose, either a double ventilated box with louver-boarded sides, fixed at a north window, and projecting 12 inches from the wall, so as to allow a free current of air to pass between the box and the wall; or in a double meat-salt ventilated box with louver-boarded sides, fixed in an exposed place, and if possible over grass. Whatever means are finally decided on, the position of the instruments should be mentioned, and should not be changed (without due notice being given to the Secretary), in order that the results of one month's observations may be strictly comparable with those of another.

The *Self-registering Thermometers* should be placed exactly horizontal. In the case of the ordinary *maximum* thermometer, with clay, glass, or steel index, the bulb may be very slightly elevated, in order that the internal column may be somewhat aided by the force of gravity in pushing forward the float or index; and in the case of the *minimum* thermometer, the bulb must be slightly depressed, to prevent a draining of the spirit to the top of the tube, and also that any part raised in vapour may return to the column. These thermometers, if read once a-day, should always be read on the evening, so that the temperatures marked by the floats indicate the minimum and the maximum of the day on which the reading is taken. N.B.—The readings of these instruments are taken from that extremity of the float which is nearest the lead of the column of mercury or of spirit.

The maximum Registering Thermometer.—For taking the extreme heat of the sun's rays should have its bulb blackened and the surface rendered dull, and it should be mounted in a blackened box, whose sides should be so high as to protect the bulb from wind. It should be so placed that the sun's rays have free access to it during the heat of the day.

The minimum Registering Thermometer.—For ascertaining the lowest temperature during the night from radiation, should have its bulb similarly blackened and rendered dull, and be similarly mounted. It should be laid out about sunset, over grass, in a place freely exposed to the sky, but raised on wooden supports a few inches above the surface, and removed during the day.

Hygrometer.—The wet bulb requires the muslin covering it to be often changed. In towns once a month, or oftener, if the weather is dusty, and the muslin gets foul; in the country whenever the muslin seems to be foul. The muslin should always be thoroughly wetted, and freed from starch, before being used; and the cotton wick which conducts moisture to it should be thoroughly wetted, else it will conduct the moisture imperfectly, and yield false results. The cotton wick is best attracted by passing its extremity through an aperture in the centre of the muslin, spreading that portion out so as to apply equally round the bulb, and then tying the muslin over the bulb. In frosty weather, water must be poured over the wet bulb, so as to form a thin film of ice on the muslin, the evaporation from the ice going on as from the simply wetted bulb.

Rain Gauge.—As "Plebeian's Rain Gauge" seem to possess several advantages over others, the Society gives the preference to them; but whatever form be employed, in order that all the stations may yield comparable results, it is recommended that the Gauge be sunk in the ground, so that the top of the receiver is nearly on a level with the top blades of close cut grass, in a place as distant as possible from trees, houses, high walls, and frequent *regional winds*. When more than one rain gauge is kept, they ought to be placed near each other, but at different heights above the ground, and their indications noted in the general remarks, mentioning their height above ground—the regular column in the Schedule being reserved for the ground rain gauge alone.

Winds.—Isolated Wind-vanes or Weather-cocks are apt to give false indications of the general direction of the wind, in consequence of the currents of air at the surface of the ground being so much influenced by the neighbourhood of hills, valleys, buildings, etc. Where low clouds are seen drifting along their direction in reference to known objects, or as noted by means of a mirror on which a compass may be laid, or by means of a circular mirror fixed over the centre of a pocket compass, will, in general, give the true direction of the current of air near the earth's surface if these clouds are near and immediately over head, that is, in or near the zenith of the observer. The motion of the higher strata of clouds gives no such indication. Feeling the clouds the general direction of the snobs of a handle or village, or of a tall chimney, gives a better indication of the general direction of the wind than any wind-vane. The observer should note whether he has ascertained the direction by reflection or otherwise. For mode of estimating the force of the wind, see "Direction of the Wind" purpose, but the best Anemometer of moderate price yet invented is Professor Robinson's Cup Wind Gauge, which registers the velocity of the wind—360 revolutions of the cups, as registered by the instrument, being equal to one statute mile.

Clouds.—The Society recommends observers to adopt the Howard nomenclature of clouds. The scale of cloud in the visible sky is reckoned from 0 to 10. Thus, a sky quite free from cloud is 0; a sky half covered with cloud is 5; and the whole visible sky covered with cloud is 10. Clouds often cover the sun, so that the indications noted in the column for clouds would not necessarily express, or agree with, the column for sunbaking. As the full moon, so long as it is above the horizon, is thought by some eminent astronomers to have a powerful effect in dispelling clouds, it would be well to note in the General Remarks any facts bearing on this point, for a few days (or nights, as the case may be) before and after every full moon; and the same observations ought to be made at the periods of new moon.

Sunshine.—The number of hours the sun shines during the day should be entered in the proper column.

Thermometers under Ground.—Through the temperature and hygrometric conditions of the air are those which chiefly influence the growth of crops, it is important for the health of the crop, and for the germination of the seed, that the soil itself should have a certain temperature. To collect facts which may illustrate this, it is recommended to have thermometers sunk 3, 12, and 22 inches below the surface of the ground, to ascertain the temperature of what may be termed the agricultural soil; and the observer should enter in the Schedule the kind of soil; whether drained or undrained; and whether naturally wet or dry.

Temperature of the Sea.—As the meteorology of the island is incomplete without a knowledge of the mean temperature of the Ocean which surrounds it, the Society strongly recommends taking the temperature of the Sea at a depth of 6 feet or 1 fathom from the end of all piers or rocks round the coast, where free from the influence of river water, and as near as may be about the time of high water. A thermometer, with its bulb fixed in a small pit, and covered with a sloping lid, and with a weight attached, is sunk to the required depth, and in ten minutes drawn up and read. The density of the sea water should, if possible, be taken at the same time. Convenient instruments are furnished by Messrs Adie and Son.

Temperature of Springs.—The temperature of Springs or Deep Wells is recommended to be taken whenever practicable, mentioning whether Spring or Well, and its depth from the surface.

Meters. *Atmospheric Barometer.* *Removable Depression or Elevation of Barometer.* *Removable Falls of Rain.* *Hill or Snow.* *Thunder and Lightning.* etc., should be specially noticed, together with the exact hour at which they were first seen, their continuance, and direction.

Birding, Lapping, and Fleeting of Trees.—It is necessary to bear in mind that varieties of the same species of tree often widely in their times of leafing and flowering. *Indicative Trees or Shrubs* of each kind should therefore be chosen (if possible early kinds), and their indications should be alone noted—always the same plant from year to year being noticed.

Uzine.—Mention whether Schombert's or Moffat's scale and papers are used. Schombert's are preferred. They may be had at Messrs Adie and Son's, 50, Princes Street, and at Mr Bryson's, 60, Princes Street, Edinburgh.

Electricity.—Pith balls suspended by a linen thread, in connection with a metallic conductor, and under cover, and the degree of a circle being used to express the degree of repulsion, form a cheap and convenient Electrometer. Dissolved glass or sealing-wax ascertains the nature of the electricity.

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

SHRUBS, ETC.	FRUITS.	AGRICULTURAL BIRDS.	First Departure.
Barberry,	Apple,	Chickadee,	
Broom,	Black Currant,	Curlew,	
Hazel,	Cherry,	House-Swallow,	
Hawthorn,	Gean,	Lapwing,	
Holly,	Gooseberry,	Plover,	
Laburnum,	Peach,	Sand-Martin,	
Lilac,	Pear,	Starling,	
Mezereum,	Plum,	Swan,	
Mountain Ash or Rowan,	Strawberry,	Rail or Corn Crake,	
Red Flowering Currant,		Other Birds, naming them,	
Rhododendron Ponticum,			
Whin,			

FOREST TREES.	In Flower.	Leaf buds first apparent.	In Leaf.	Dressed of Leaves.	CROPS mentioning variety.	Soiling or Shading.	Apertures above Ground.	In Ear.	First Out.
Alder,					Barley,				
Aspen,					Born or Bigg,				
Beech,					Oats,				
Birch,					Wheat,				
Elm,					Beans,				
Larch,					Pease,				
Line,					Potatoes,				
Oak,					Turnips,				
Sycamore or Plane,					Rye Grass,				

OBSERVATIONS IN CONNECTION WITH THE PERIODICAL RETURN OF THE SEASONS.

EDINBURGH

21, Rutland Street.

Sec., Meteorological Society,

Edinburgh

DR. STARK,

Mr. Burgess

Presented Nov/59

METEOROLOGICAL RETURNS.

SCOTTISH METEOROLOGICAL SOCIETY

SCOTTISH METEOROLOGICAL SOCIETY.

Observations taken at Braemar, County of Angus, in Lat. 56° 45' N., Long. 2° 45' W., Height above Sea 1000 feet.
Distance from Sea 10 miles. During the MONTH of December 1859.

Days of Week.	Days of Month.	BAROMETER.		SELF-REGISTERING THERMOMETERS.				HYGROMETER.				WIND.				RAIN.		CLOUD.	SUNSHINE.	THERMOMETERS under Ground.		Temperature of SPRING or WET BALL.	Temperature of SEA.	OZONE.	ELECTRICITY.	GENERAL REMARKS. As to occurrence of Thunder, Lightning, Storms, Hail, Meteors, Remarkable Depression or Elevation of Barometer, etc. Mention the hour at which these began and ended.		
		9 h. A.M.		9 h. P.M.		Max. in Air.	Min. in Air.	Max. Black bulb in Sun.	Min. Black bulb over Grass.	9 h. A.M.		9 h. P.M.		Days on which it fell.	Amount.	h. A.M.												
		Barometer.	Attach- ed Ther- mometer	Barometer.	Attach- ed Ther- mometer					Dry bulb.	Wet bulb.	Dry bulb.	Wet bulb.			Direction.	Mean Force 1-6.			Direction.	Mean Force 1-6.						3 inches.	12 inches.
Mon.	1	28.78	28.96	36.	29.1	36.8	29.1	32.	32.	32.1	32.	N.	2.0	E.	1.	0.34	0								5			
	2	28.98	29.00	35.	17.8	35.8	17.8	26.	26.	17.8	17.8	S.	1.5	E.	0	0.130	0								10.	5		
	3	28.90	28.52	31.5	10.	34.	5.	10.1	10.	31.8	31.6	S.E.	0.	S.W.	2.	0	0								9.	Snow -		
	4	28.09	27.76	40.8	29.4	42.	27.5	36.6	36.2	39.9	38.9	S.W.	5.	S.W.	1.5	0.10	0								10.	no		
	5	27.65	27.87	46.	32.	46.	26.	36.8	34.8	31.5	31.	S.W.	2.	S.W.	1.	0.37	0								10.	do		
	6	28.03	28.14	33.7	31.	40.4	26.2	32.	31	31.	30	S.W.	5.	S.W.	3.	0.100	0								10.	do		
	7	28.31	28.75	36.	30.9	37.2	27.	33.4	32.8	34.	32.	S.W.	5.	S.W.	2.	0.010	0								10.	do		
	8	29.02	29.18	41.2	33.8	41.2	27.3	37.2	35.2	41.1	40.	S.	0.2	S.	1.5	0	0								10.	Aurora Borealis		
	9	29.32	29.41	42.1	33.	42.1	34.2	39.6	38.0	38.9	37.7	S.	1.	S.W.	1.	0	0								9.			
	10	29.46	29.39	41.8	35.	42.	35.1	40.3	39.3	39.9	37.9	S.W.	0	S.W.	0.2	0.130	0								10.			
	11	29.23	29.17	44.7	38.8	40.0	36.8	41.	39.8	42.2	41.6	S.W.	1.	S.W.	1.	0	0								7.			
	12	29.31	29.30	43.	28.	43.	24.5	33.3	32.1	28.	27.1	S.	0.2	S.W.	0.5	1.20	0								10.	Snow		
	13	29.08	29.05	31.8	22.	31.8	20.2	27.2	26.8	23.	22.	N.W.	0.	N.	1.	0.90	0								9.	no		
	14	28.87	28.95	25.	21.	30.8	15.5	21.	20.8	24.5	23.4	N.	4.	N.	2.	0.60	0								9.	do		
	15	28.81	28.65	25.6	23.2	29.5	19.2	23.8	22.4	24.	22.8	N.W.	0.5	S.W.	1.	0.20	0								10.	do		
	16	28.52	28.41	27.0	23.8	36.2	19.5	24.	23.3	25.7	24.8	N.W.	0.2	N.W.	0.5	0.80	0								10.			
	17	28.51	28.54	26.5	23.	38.2	23.	22.6	24.1	23.6	23.6	N.E.	0.5	S.	1.2	0.30	0								10.			
	18	28.47	28.40	16.	1.	26.8	15.	15.	1.0	1.0	1.0	N.	0.	S.W.	0.	0	0								9.			
	19	28.35	28.28	28.	0.	28.5	24.2	5.5	5.4	27.6	26.3	N.	0.	S.W.	0.5	0	0								8.			
	20	28.14	27.92	36.	27.7	36.0	29.2	31.0	29.3	34.8	33.8	S.W.	1.	S.W.	2.	0.10	0								10.			
	21	27.65	27.90	35.8	32.	35.8	24.1	33.2	32.7	33.4	32.	N.	1.	N.W.	3.	0.40	0								10.			
	22	28.19	28.26	34.2	29.8	34.2	27.9	30.6	29.6	32.4	30.	N.W.	4.	S.W.	4.	0.21	0								10.	Lightning		
	23	28.36	28.20	33.2	29.8	33.5	27.	32.3	31.5	30.2	29.9	N.E.	0.2	S.W.	0	0.160	0								10.	10 inches of Snow on ground		
	24	27.80	27.80	34.	29.0	34.2	22.	32.	31.	34.2	34.1	S.	1.	S.	0	0.130	0								10.	Snowing all day		
	25	27.75	27.78	36.2	23.4	36.2	30	22.6	22.	33.4	33.1	S.	0.	N.	0	0.210	0								7.	15 inches of Snow on ground		
	26	27.90	27.05	36.	34.	36.5	30.	34.4	34.	34.4	34.	S.E.	3.	S.	4.	0	0								9.	Sheet Ah.		
	27	27.95	27.85	36.2	23.3	36.2	24.3	34.	33.4	34.3	34.	N.E.	0.	N.E.	0.	0.08	0								7.			
	28	28.07	27.84	33.2	29.1	33.2	30.2	30	29.	37.2	37.1	N.E.	0.	N.E.	0.2	0	0								7.			
	29	27.04	27.91	33.8	33.	33.8	25.3	35.8	34.3	32.6	33.	S.W.	0.5	S.W.	0.5	0.28	0								5.			
	30	27.83	27.90	38.2	29.8	38.2	32	35.9	35.	37.8	36.0	S.W.	0.2	S.W.	1.5	0	0								9.			
	31	27.22	28.30	40	35.4	40	32.5	37	35.7	36.	35	S.W.	1.	S.W.	0.5	0.02	0								9.			
	Sums.	28.404	28.401	35.1	27.0	36.7	24.9	29.7	29.1	31.1	30.3	1.29		1.18		22.6833										2		
	Means.	28.404	28.401	35.1	27.0	36.7	24.9	29.7	29.1	31.1	30.3	1.29		1.18		7.8										285		
	Index Errors.	-0.09	-0.09	-	+1	+2	-1	-	-1	-	-1																9.2 = Mean	
	Correc- tion for Diurnal Range.	-0.10	-0.10																									
	Corrected Means.	28.395	28.392	35.1	27.1	36.9	24.8	29.7	29.0	31.1	30.2																	
	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	

Barometer, mean corrected reading of Column No. 1 (A.M.), = 28.395
Diameter of tube 1/8 inch; correction for capillarity to be added, +
Sum, 4.02
Correction for Temperature from Column No. 2 to be deducted, -
Sum, 0.04
Correction for Height above Sea-level, 1000 feet, to add, +
Barometer corrected and reduced to 32° and Sea-level, 28.398

Column No. 3 (P.M.), = 28.401
Capillarity, +
Sum, 3.99
Temp. from Col. 4, -
Sum, 0.06
Height, +
At 32° and Sea-level, 28.396

Barometer, Highest observed reading of Month, = 29.460 10th
Lowest do. do., = 27.040 29th
Difference, or Monthly Range, = 2.420

SUMMARY OF THE WINDS.										
Direction.	N	NE	E	SE	S	SW	W	NW	Calm or Variable.	Mean Force.
A.M.	2	3	6	1	4	9	3	4		1.29
P.M.	2	2	4	0	6	14	1	2		1.18

Dry bulb Thermometer (mean of Cols. 9 and 11),* 30.4
Wet bulb Thermometer (mean of Cols. 10 and 12),* 29.7
† Dew-point Temperature, 27.8
† Elastic Force of Vapour, 1.51
† Weight of Vapour in a Cubic Foot of Air,
† Additional Weight required to Saturate a Cubic Foot,
† Degree of Humidity (Saturation 100), 89

Highest Reading Self-Registering Thermometer, 48.0 on the 18th
Lowest do. do., 0.0 on the 19th
Difference, being Monthly Range, 48.0
Mean of Self-Registering Thermometers, 31.8
Mean Daily Range, 8.0
Greatest Daily Range, 48.0 on 11th

(Signed) Thos. Pierce Esq 18th
(Designation)

* If the readings are taken at 9^h and 3^h, the 9^h readings to be alone taken to account, as the correction for Diurnal Range in Scotland is unknown.
† All these calculated from Glaisher's Hygrometric Tables, Second Edition only.
‡ The Diurnal Range for Scotland is as yet unknown.

INSTRUCTIONS FOR MAKING METEOROLOGICAL OBSERVATIONS.

Those persons who kindly furnish Monthly Tables of the Weather to the Scottish Meteorological Society are requested to attend to the following Instructions, seeing that one of the most important ends of Meteorological Observations is their being comparable with one another; and for this purpose it is requisite that all should, if possible, observe at a like hour, and in a like manner, and have their instruments placed in so far as circumstances allow, in a like position:

Hour of Observation.—All instruments which are observed twice a-day, should be read at the same hour morning and evening, in order to furnish mean results. The Society recommends a quarter before nine o'clock, morning and evening, as the most convenient hour; but should this be inconvenient for the observer, another hour may be chosen, attending, however, to the above rule, that the evening and morning readings be taken at the same hour, and this hour entered on the schedule.

Barometer.—Barometers of Messrs. Adie and Son's construction are recommended; but any instruments may be used which have adjustable surfaces, and have been compared. Before this instrument is suspended for use it should be examined in order to ascertain whether the space above the mercury is free from air. This is done by inclining the instrument somewhat from the vertical position, when, if free from air, the mercury will settle against the upper end of the tube with a sharp top. The mercury should then completely fill the tube. If any air has got admittance, it should be driven into the extremity by pressing the instrument, and tapping it gently with the hand. If it cannot be thus expelled, the instrument is useless till repaired.

The Barometer should be hung in a good light, and perfectly perpendicular, as ascertained by the plumb line; and it ought always to be gently tapped before taking the reading, to prevent adhesion of the mercury to the tube. In reading the eye ought to be placed on the exact level of the top of the column of mercury. The reading of the attached Thermometer ought always to be the first taken, as the heat of the breath, or the proximity of the person, are apt to influence its readings.

The corrections necessary to be applied to the barometric readings depend on the form of the instrument. The mode of making these corrections, and the tables employed for the purpose, will be found in the "Report of the Committee of the Royal Society on Physics and Meteorology," 1840, price 1s. The daily readings of the Barometer ought to be entered on the Schedule as read off, and the corrections only applied to the mean for the month.

Self-registering Thermometers and Hygrometers.—These should be placed alongside of each other, in a place freely exposed to the air, but protected from sunning, and as near as may be four feet from the general surface of the ground. Different contrivances are used for this purpose, either a double ventilated box with louver-boarded sides, fixed at a north window, and projecting 12 inches from the wall, so as to allow a free current of air to pass between the box and the wall; or in a double louver-boarded box with louver-boarded sides, fixed in an exposed place, and if possible over grass. Whatever means are finally decided on, the position of the instruments should be mentioned, and should not be changed (without due notice being given to the Secretary), in order that the results of one month's observations may be strictly comparable with those of another.

The Self-registering Thermometers should be placed exactly horizontal. In the case of the ordinary maximum Thermometer, with clay, glass, or steel index, the bulb may be very slightly elevated, in order that the mercurial column may be somewhat aided by the force of gravity in pushing forward the float or index; and in the case of the minimum Thermometer, the bulb must be slightly depressed, to prevent a falling of the spirit to the top of the tube, and also that any part raised in vapour may return to the column. These Thermometers, if read once a-day, should always be read on the evening, so that the temperatures marked by the floats indicate the minimum and the maximum of the day on which the reading is taken. N.B.—The readings of these instruments are taken from that extremity of the float which is nearest the head of the column of mercury or of spirit.

The maximum Registering Thermometer, for taking the extreme heat of the sun's rays, should have its bulb blackened and the surface rendered dull, and it should be mounted in a blackened box, whose sides should be so high as to protect the bulb from wind. It should be so placed that the sun's rays have free access to it during the heat of the day.

The minimum Registering Thermometer, for ascertaining the lowest temperature during the night from radiation, should have its bulb suitably blackened and rendered dull, and be similarly mounted. It should be laid out, about sunset, over grass, in a place freely exposed to the sky, but raised on wooden supports a few inches above the surface, and removed during the day.

Hygrometer.—The wet bulb requires the muslin covering it to be often changed. In towns once a month, or oftener, if the weather is dusty, and the muslin gets foul; in the country whenever the muslin seems to be foul. The bulb should be covered with thin tissue or blotting paper below the muslin, and the muslin should always be thoroughly wetted, and freed from starch, before being used; and the cotton wick which conducts moisture to it should be previously soaked in a solution of washing soda, and then in pure water, before being attached, in order that

it may be thoroughly wetted, else it will conduct the moisture imperfectly, and yield false results. In frosty weather, water must be poured over the wet bulb, so as to form a thin film of ice on the muslin, the evaporation from the ice going on as from the simply wetted bulb.

Rain Gauge.—As "Pleating" Rain Gauges seem to possess several advantages over others, the Society gives the preference to them; but whatever form be employed, in order that all the stations may yield comparable results, it is recommended that the Gauge be sunk in the ground, so that the top of the receiver is nearly on a level with the top blades of close cut grass, in a place as distant as possible from trees, houses, high walls, and irregular or broken ground. When more than one Rain Gauge is kept, they ought to be placed near each other, but at different heights about the ground, and their indications noted in the general remarks, mentioning their height above ground—the regular column in the Schedule being reserved for the ground Rain Gauge alone.

Winds.—Isolated wind-vanes or weather-cocks are apt to give false indications of the general direction of the wind, in consequence of the currents of air at the surface of the ground being so much influenced by the neighbourhood of hills, valleys, buildings, etc. Where low clouds are seen drifting along, their direction in reference to known objects, or as noted by means of a mirror fixed over the centre of a pocket compass, will, in general, give the true direction of the current of air near the earth's surface. The notion of the higher strata of clouds gives no such indication. Following the clouds, the general direction of the smoke of a hearth or village, or of a tall chimney, gives a better indication of the general direction of the wind than any wind-vane, unless otherwise. It is generally agreed to reckon the force of the wind from 0 to 6; the latter being the severest hurricane in this island.

Clouds.—The Society recommends observers to adopt the Howard nomenclature of clouds. The scale of cloud in the visible sky is reckoned from 0 to 10. Thus, a sky quite free from cloud is 0; a sky half covered with cloud is 5; and the whole visible sky covered with cloud is 10. Clouds often cover three-fourths or even more of the visible sky without obstructing the sunshining, so that the indications noted in the column for clouds would not necessarily express, or agree with, the column for sunshining. As the full moon, so long as it is above the horizon, is thought by some eminent astronomers to have a powerful effect in dispersing clouds, it would be well to note in the general observations any facts bearing on this point, for a few days (or nights, as the case may be) before and after every full moon; and the same observations ought to be made at the periods of new moon.

Sunshine.—The amount of sunshine may be represented by figures in the fractional form, of which the denominator indicates the number of hours from sunrise to sunset, and the numerator the number of hours the sun shines. Thus, if the sun rose at 6, and set at 6, and during that period alone for 3 hours, it would be registered as $\frac{3}{12}$.

Thermometers under Ground.—Though the temperature and hygrometric conditions of the air are those which chiefly influence the growth of crops, it is important for the health of the crop, and for the germination of the seed, that the soil itself should have a certain temperature. To collect facts which may illustrate this, it is recommended to have Thermometers sunk 3 inches and 12 inches below the surface of the ground, to ascertain the temperature of what may be termed the agricultural soil.

Temperature of the Sea.—As the meteorology of the island is quite incomplete without a knowledge of the mean temperature of the ocean which surrounds it, the Society strongly recommends taking the temperature of the sea at a depth of 6 feet or 1 fathom from the end of all piers or rocks round the coast, where free from the influence of river water, and as near as may be about the time of high water. A Thermometer, with its bulb fixed in a small tin pitcher covered with a sloping lid, and in ten minutes drawn up and read. Convenient and cheap instruments are furnished by Messrs. Adie and Son, and Mr. Bryson, Edinburgh.

The temperature of springs or deep wells is recommended to be taken whenever practicable, mentioning whether spring or well, and its depth from the surface.

Meteors.—Aurora Borealis, remarkable Depressions or Eclipses of the Moon, comets, etc., should be specially noticed, together with the exact hour at which they were first seen, their continuance, and direction.

Budding, Leafing, and Flowering of Trees.—It is necessary to bear in mind that varieties of the same species of tree differ widely in their times of leafing and flowering. Individual trees or shrubs of each kind should therefore be chosen (if possible early kinds), and their indications should be alone noted—always the same plant from year to year being noticed.

Ornamental Plants.—Mention whether Salubrious or Mofat's scale and papers are used. They may be had at Messrs. Adie and Son's, 50, Princes Street, and at Mr. Bryson's, 60, Princes Street, Edinburgh. **Electricity.**—Pith balls suspended by a silk thread, in connection with a metallic conductor, and under cover, and the degrees of a circle being used to express the degree of repulsion, form a cheap and convenient electrometer. Exposed glass or sealing-wax ascertains the nature of the electricity.

OBSERVATIONS IN CONNECTION WITH THE PERIODICAL RETURN OF THE SEASONS.

FOREST TREES.	Flower.	Leaf buds first appear.	In Leaf.	Dropped of Leaves.	CROPS, mentioning variety.	Sorting or Puntling.	APPEARING above Ground.	In Ear or Flower.	First Out or Raised.
Alder,					Barley,				
Ash,					Beer or Big,				
Beech,					Oats,				
Birch,					Peas,				
Elm,					Potatoes,				
Larch,					Turnips,				
Linæ,					Rye Grass,				
Oak,									
Sycamore or Plane,									

SHRUBS, ETC.	First in Blossom.	FRUITS	First in Blossom.	Fruit ripe generally.	MIGRATORY BIRDS.	First Arrival.	Departure.
Barberry,		Apple,			Cuckoo,		
Bourtree or Elder,		Black Currant,			Curlew,		
Broom,		Cherry,			House-Swallow,		
Hazel,		Gean,			Lapwing,		
Hawthorn,		Gooseberry,			Plover,		
Holly,		Peach,			Sand-Martin,		
Laburnum,		Pear,			Swan,		
Lilac,		Plum,			Rail,		
Mezerion,		Strawberry,			Other Birds, naming them.		
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., whether plentiful, or in perfection; whether any have suffered from blight, disease, etc. Whether Epizootic disease prevails among Cattle; and the Agricultural condition of the district generally.

METEOROLOGICAL RETURNS.

Sec., Meteorological Society,
12 St. Andrew Square, Edinburgh.

DR. STEVEN. Mr. Burrows

To

December 1859