

SCOTTISH METEOROLOGICAL SOCIETY.

Observations taken at Maemas, County of Shannon, in Lat. 57° 11', Long. 3° 26' W, Height above Sea 1110 feet.Distance from Sea 57 miles.During the MONTH of January 1857.

Days of Week.	Days of Month.	BAROMETER.		SELF-REGISTERING THERMOMETERS.				HYGROMETER.				WIND.				RAIN.		CLOUD.	SUNSHINE.	THERMOMETERS under Ground.		Temperature of Spring or Well.	Temperature of 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.		
		9 ^h A.M.		3 ^h P.M.		Max. in Air.	Min. in Air.	Max. Black bulb in Sun.	Min. Black bulb over Grass.	9 ^h A.M.		3 ^h P.M.		9 ^h A.M.		3 ^h P.M.				Days in which it fell.	Amount.					3 inches.	12 inches.
		Barometer.	Attached Thermometer.	Barometer.	Attached Thermometer.					Dry bulb.	Wet bulb.	Dry bulb.	Wet bulb.	Direction.	Mean Force 1-6.	Direction.	Mean Force 1-6.										
		28.37		47.4	41.7			42.0	40.2	43.8	41.9	S.W.	1	S.W.	1.5	0.030	0.030										
2	28.14	28.00		43.7	36.3			47.2	45.7	38.1	36.9	S.W.	2	S.W.	4	0.135	0.135								Thunder Sept 4 m		
3	28.04	28.13		38.6	30.3			31.0	30.0	32.8	32.8	S.W.	0	S.	2	0.036	0.036										
4	28.47	28.80		32.2	22.0			27.7	26.9	22.4	22.0	N.E.	2	S.	1.5	0.043	0.043										
5	29.01	29.11		32.6	21.4			31.0	29.3	21.4	21.2	S.	0	S.W.	0	0.012	0.012										
6	29.15	29.15		32.8	21.2			25.9	24.9	28.1	27.0	S.E.	0.5	S.W.	1	0	0										
7	29.05	28.90		29.1	27.3			23.1	23.0	30.0	29.6	S.W.	3.5	S.W.	2	0	0										
8	28.86	28.82		41.3	29.5			39.8	38.1	40.2	39.0	S.W.	2	S.W.	0.5	0.015	0.015										
9	28.54	28.15		48.3	39.0			43.9	42.3	49.1	47.2	S.W.	1.5	S.W.	3	0.035	0.035										
10	28.14	27.97		48.8	36.0			41.2	39.9	36.9	36.0	S.W.	0.2	S.W.	0.5	0.030	0.030										
11	27.95	28.02		37.9	28.0			28.2	28.0	31.6	30.7	S.W.	0	S.W.	0	0	0										
12	27.96	28.00		33.2	25.9			25.9	25.3	26.6	26.1	S.W.	0.2	S.W.	0	0	0										
13	28.18	28.58		35.0	26.8			34.9	32.9	30.9	29.6	S.W.	0.5	N.W.	3	0	0										
14	28.76	28.67		32.4	24.7			26.0	23.0	32.4	31.5	N.E.	0.5	S.W.	2	0.020	0.020										
15	28.60	28.65		40.7	31.4			38.0	36.1	37.7	35.7	S.W.	1.5	S.W.	1.5	0	0										
16	28.70	28.82		38.2	33.2			34.3	32.8	38.1	36.3	N.	0	S.W.	0.5	0.014	0.014										
17	28.79	28.79		45.2	37.2			41.3	39.9	45.3	43.7	S.W.	1	S.W.	0.5	0	0										
18	28.75	28.58		50.0	43.3			47.0	44.9	46.8	42.0	S.W.	2	S.W.	4	0	0										
19	28.85	28.64		47.7	36.2			37.4	35.0	37.5	35.7	S.W.	1	S.W.	3	0	0										
20	28.04	28.01		39.3	25.7			34.0	32.0	34.7	22.3	S.W.	2	N.	0	0.138	0.138								Thunder 6 p.m.		
21	28.16	28.60		36.6	20.6			35.0	32.8	34.0	32.0	N.W.	1.5	N.E.	2	0.010	0.010										
22	28.40	27.95		39.9	30.2			32.0	31.0	34.8	33.8	S.W.	1	N.W.	1	0.119	0.119										
23	27.77	27.76		35.5	30.0			31.0	29.8	34.7	34.7	N.W.	4	N.	6	0.140	0.140										
24	28.07	28.32		34.0	32.1			34.0	34.0	33.1	32.1	N.	4	N.E.	3	0.030	0.030										
25	28.58	28.70		32.7	28.0			31.2	31.1	37.2	27.0	N.E.	2	N.E.	2	0.570	0.570										
26	28.78	28.83		32.2	25.8			25.9	25.7	27.0	26.1	N.E.	0	N.E.	0.5	0.017	0.017										
27	28.74	28.74		31.5	26.2			31.8	30.5	29.0	28.0	N.	2	S.E.	0	0	0										
28	28.70	28.65		29.2	8.5			23.7	22.0	8.5	8.0	N.E.	0.2	N.E.	0	0.050	0.050										
29	28.64	28.55		23.3	4.9			10.1	10.0	24.0	23.9	S.W.	0.2	S.W.	0.5	0	0										
30	28.30	28.13		33.3	24.0			30.0	29.5	33.0	32.1	S.W.	0	S.W.	0	0.062	0.062										
31	28.25	28.45		31.8	23.0			23.0	21.7	28.0	26.6	N.W.	0	S.W.	1	0.020	0.020										
Sums.	8828.5	8828.4		1144.8	86.6			1002.5	96.2	1007.9	97.2	36.3		46.5	20.3	46.6											
Means.	28.479	28.478		36.91	28.05			32.34	31.05	32.50	31.37	1.17		1.50		5.7											
Index Errors.	-0.07	-0.07		+7.0	+1.00			-1.0	-1.0	-1.0	-1.0																
Correction for Diurnal Range.																											
Corrected Means.	28.462	28.461		37.61	29.05			32.24	30.95	32.40	31.27	1.17		1.50		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	

Barometer, mean corrected reading of Column No. 1 (A.M.),.....= 28.462Column No. 3 (P.M.),.....= 28.461Barometer, Highest observed reading of Month,.....= 29.15Diameter of tube inch; correction for capillarity to be added,.....+ 0.030Capillarity,.....+ 0.030Lowest do. do.,.....= 27.76 in 23Sum,.....= 28.492Sum,.....= 28.491Difference, or Monthly Range,.....= 1.39Correction for Temperature from Column No. 1 to be deducted,.....= 0.03Temp. from Col. No. 1,.....= 0.03Sum,.....= 28.489Sum,.....= 28.488Correction for Height above Sea-level, feet, to add,.....= 1.250Height,.....= 1.250Barometer corrected and reduced to 32° and Sea-level,.....= 29.739At 32° and Sea-level,.....= 29.738

SUMMARY OF THE WINDS.										
Direction.	N	NE	E	SE	S	SW	W	NW	Calm or Variable.	Mean Force.
A.M.	3	4	2	1	1	18	2	2	7	1.33
P.M.										

Dry bulb Thermometer (mean of Cols. 9 and 11),.....= 32.3Highest Reading Self-Registering Thermometer,.....= 48.8 on the 10thWet bulb Thermometer (mean of Cols. 10 and 12),.....= 31.1Lowest do. do.,.....= 4.9 on the 29th† Dew-point Temperature,.....= 28.4Difference, being Monthly Range,.....= 43.9† Elastic Force of Vapour,.....= 156.4Mean of Self-Registering Thermometers,.....= 33.33† Weight of Vapour in a Cubic Foot of Air,.....= 1.848Mean Daily Range,.....= 8.56† Additional Weight required to Saturate a Cubic Foot,.....= 0.34

Greatest Daily Range,.....=

† Degree of Humidity (Saturation 100),.....= 85* 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.

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.

Malvern

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 up, 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-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 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 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 a Fleming's Rain Gauge" seen 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 motion of the higher strata of clouds gives no such indication. Failing 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 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 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 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 shone 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 with a weight attached, is sunk to the required depth, 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.

Meteor. 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, then continuances, and direction. **Birding, Laying, and Flowering 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. *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 Schönbain's 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. Dusted 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.	Divested of Leaves.	CROPS, mentioning variety.	Soiling or Ploughing.	Appearing above Ground.	In Ear or Flower.	First Cut or Raised.
Alder.....					Barley.....				
Ash.....					Beer or Bigg.....				
Beech.....					Oats.....				
Birch.....					Peas.....				
Elm.....					Wheat.....				
Larch.....									
Line.....									
Oak.....									
Sycamore or Plush.....									

SHRUBS, ETC.	First in Blossom.	FRUITS.	First in Blossom.	Fruit ripe generally.	MIGRATORY BIRDS.	First Arrived.	Departure.
Barberry.....		Apple.....			Cuckoo.....		
Bountree or Elder.....		Black Currant.....					
Broom.....		Cherry.....					
Hazel.....		Gent.....					
Hawthorn.....		Gooseberry.....					
Holly.....		Peach.....					
Laburnum.....		Pear.....					
Lilac.....		Plum.....					
Mezerion.....		Strawberry.....					
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 state of the agricultural condition of the district generally.

METEOROLOGICAL RETURNS

EDINBURGH

21, Rutland Street,

Sec., Meteorological Society.

DR STARK.

FEB 7 M 1857

RECEIVED FEB 6 1857

January 1857

SCOTTISH METEOROLOGICAL SOCIETY.

Observations taken at Thornhill, County of Midlothian, in Lat. 55° 44', Long. 3° 44', Height above Sea 1110 feet.Distance from Sea 57 miles.During the MONTH of February 1857.

Days of Week.	Days of Month.	BAROMETER.		SELF-REGISTERING THERMOMETERS.				HYGROMETER.				WIND.				RAIN.		CLOUD.	SUNSHINE.	THERMOMETERS under Ground.		Temperature of SPRING or WELL.	Temperature of SOIL.	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.	
		h. A.M.	h. P.M.	Max. in Air.	Min. in Air.	Max. Black bulb in Sun.	Min. Black bulb over Grass.	h. A.M.	h. P.M.	h. A.M.	h. P.M.	Direction.	Mean Force 1-6.	Direction.	Mean Force 1-6.	Days on which it fell.	Amount.			h. A.M.							
																				3 inches.	12 inches.						
																											Barometer.
			inches.													days.	inches.	1-10									
1			28.42	33.0	27.5			27.1	26.7	31.9	31.7	S.W.	0	S.W.	2	0	cu d						10				
2			28.35	31.4	28.2			28.8	28.1	29.0	28.4	S.	3	S.E.	4	0.07	10 mi.						10				
3			28.57	28.77	29.0	26.0		28.0	27.2	27.0	26.2	S.W.	0.2	S.W.	0.5	0.06	3 mi.						10				
4			28.82	28.63	34.7	26.1		30.0	28.7	34.7	33.3	S.W.	0.5	S.W.	4	0	4 cu						10				
5			28.48	28.34	41.8	33.3		41.6	39.9	38.0	36.4	S.W.	3	S.W.	2.5	0.04	10 mi.						10				
6			28.37	28.35	39.1	34.9		35.9	33.9	38.1	35.6	S.W.	3	S.W.	1	0.01	6 mi.						10				
7			28.05	28.14	41.8	32.8		42.1	39.9	33.5	31.5	S.W.	5	S.W.	4	0.03	8 mi.						10	Thunder p.m.			
8			28.23	28.21	36.3	32.0	493	34.2	34.2	35.8	33.0	S.W.	4	S.W.	2.5	0.06	8 mi.						8				
9			28.24	28.13	39.1	34.2		35.5	33.8	38.0	36.7	N.E.	1	S.W.	1	0	cu d						8				
10			28.10	28.23	28.2	35.3		36.1	33.8	36.8	35.2	S.W.	1.5	S.W.	0.5	0.10	cu d						9				
11			28.25	28.43	39.9	30.7		39.3	37.5	31.1	30.8	S.W.	2	S.W.	2	0	2 mi.						8				
12			28.73	28.76	41.0	30.0		35.7	33.0	41.0	39.5	N.W.	3	S.W.	2	0.05	cu						10				
13			28.73	28.76	46.1	39.8		43.4	40.9	46.0	44.3	S.W.	1.5	S.W.	1	0.03	8 mi.						9				
14			28.76	28.89	44.9	42.2		46.0	42.0	43.3	41.2	S.W.	0	S.W.	1	0	10 mi.						8				
15			29.02	28.96	43.0	38.0		38.3	38.0	38.3	36.5	E.N.E.	0	S.W.	1	0	8 mi.						9	mist			
16			28.73	28.75	48.8	32.5		33.5	32.0	37.8	36.2	S.W.	1.5	S.W.	1	0.03	1 mi.						8	do			
17			28.65	28.61	42.0	34.7		39.6	38.7	42.0	40.1	S.W.	2	S.W.	1	0.01	7 mi.						8	do			
18			28.70	28.78	45.7	38.0		40.2	38.8	39.8	38.1	S.W.	0.5	S.W.	0.5	0	cu cu						10				
19			28.90	29.00	45.0	32.2		33.9	32.8	34.4	30.7	S.W.	0	S.W.	0	0	2						8				
20			28.91	28.83	40.5	29.9		32.8	32.0	37.7	36.0	S.W.	0	S.W.	0.2	0	cu d						7.5				
21			28.64	28.64	47.1	36.0		39.0	38.1	43.0	44.1	S.W.	3	S.W.	2	0.01	10 mi.						10				
22			28.53	28.58	44.0	40.6		44.2	41.4	40.6	39.0	S.W.	8.5	S.W.	5	0.01	7 mi.						10				
23			28.90	28.96	41.2	33.1		34.0	32.2	35.9	33.4	S.W.	0.2	S.W.	3	0.26	1 cu						10				
24			28.83	28.80	42.8	34.0		38.9	37.9	40.2	38.5	S.W.	4.	S.W.	1.5	0.01	10 mi.						10	mist a.m.			
25			28.84	29.05	41.7	32.3		39.0	37.1	34.0	32.0	S.W.	0.5	S.W.	0	0	cu d						10				
26			28.05	28.84	44.0	26.1		35.0	32.9	40.3	38.4	S.W.	4	S.W.	4	0	cu d						9				
27			28.87	28.99	50.6	39.1		45.8	44.6	45.3	43.0	S.W.	1.5	S.W.	1	0	7 mi.						10				
28			29.13	29.29	53.7	43.3		50.4	47.3	44.0	41.9	W	2	S.E.	0	0	3 cu						10				
29																											
30																											
31																											
Sums.		80198	80254	16749	3430			10445	10033	10530	10107	574		43.2		15	180							239.5			
Means.		28.642	28.662	41.69	33.68			34.30	33.83	34.78	36.09	18.3		1.72		Rain	6.4							9.2			
Index Errors.		-.017	-.017	+ .70	+ 1.00			- .10	- .10	- .10	- .10																
Correc- tion for Diurnal Range.																											
Corrected Means.		28.625	28.645	42.39	34.68			34.20	33.73	34.68	35.99	1.85		1.72	15.02	6.4								9.2			
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.),.....= 28.625 Column No. 3 (P.M.),.....= 28.645 Barometer, Highest observed reading of Month,.....= 29.29
Diameter of tube _____ inch; correction for capillarity to be added,.....+ 30 Capillarity,.....= + 30 Lowest do. do.,.....= 28.05
Sum,..... 28.658 Sum,..... 28.675 Difference, or Monthly Range,.....= 1.24
Correction for Temperature from Column No. 1 to be deducted,.....= 17 Temp. from Column No. 3,.....= 17
Sum,..... 28.641 Sum,..... 28.658 28.649
Correction for Height above Sea-level, 1110 feet, to add,.....= + 1.250 Height,.....= + 1.250 1.250
Barometer corrected and reduced to 32° and Sea-level,.....= 29.891 At 32° and Sea-level,.....= 29.908 29.899

Dry bulb Thermometer (mean of Cols. 9 and 11),*..... 34.44
Wet bulb Thermometer (mean of Cols. 10 and 12),*..... 33.86
† Dew-point Temperature,..... 33.6
† Elastic Force of Vapour,..... 1.92
† Weight of Vapour in a Cubic Foot of Air,..... 2.228
† Additional Weight required to Saturate a Cubic Foot,..... 1.05
† Degree of Humidity (Saturation 100),..... 87

Highest Reading Self-Registering Thermometer,..... 33.7 on the 28
Lowest do. do.,..... 26.0 on the 31
Difference, being Monthly Range,..... 27.7
Mean of Self-Registering Thermometers,..... 38.33
Mean Daily Range,..... 7.7
Greatest Daily Range,.....

(Signed)

(Designation)

* If the readings are taken at 9h and 3h, the 9h 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 deduced. No Wax or Wafers ever to be employed in closing the Schedule—the Gummed Corner to be alone used.

condition of the district generally.

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 machine, 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

Gauche 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

Winds.—Isolated wind-venos or ground-cools 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 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 motion of the higher strata of clouds gives no such indication. Fing the clouds, the general direction of the smoke

of a hamlet 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 estimated the direction by reflection or 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. Pius, a sky unit free

from clouds 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 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 dispersing clouds, it would be well to note in the general observation

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

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 tempera-

ture 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 middle of the bay. A thermometer with its bulb fixed in

small tin plier, covered with a sloping lid, and with a weight attached, is sunk to the required depth, 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 possible, mentioning whether spring or well, and its depth from the surface.

(From *Scott's Periodic*, 1855, p. 27.)

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),

Ozone.—Mention whether Schottky's or Moritz's scale and papers are used. They may be had at Messrs Ait 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 circle being used to express the degree of repulsion, form a

heap and convenient electrometer. Excited glass or sealing-wax ascertains the nature of the electricity.

7.

EDINBURGH.

21, Rutland Street,

Sec., Meteorological Society,

DR STARK,

 $\mathcal{O}L$

APR 7 1957
BMR 67

February 1857

OBSERVATIONS IN CONNECTION WITH THE PERIODICAL RETURN OF THE SEASONS.

FOREST TREES.	Flower.	Leaf buds first appear.	In Leaf.	Directed of Leaves.	CROPS, new-growing variety.	Sorting or Planting.	Asperities above ground.	In Ear or Flower.	First Cut or Raised.
Alder.....					Barley.....				
Ash.....					Beer or Big.....				
Beech.....					Oats.....				
Birch.....					Wheat.....				
Elm.....					Beans.....				
Larch.....					Pease.....				
Lime.....					Potatoes.....				
Oak.....					Turnips.....				
Sycamore or Plane.....					Rye Grass.....				

SHRUBS, ETC.	First in Blossom.	FRUITS.	First in Blossom.	First Bice 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.....			Starling.....		
Lilac.....		Plum.....			Swan.....		
Mazoeon.....		Strawberry.....			Rail.....		
Mountain Ash or Rowan.....					Other Birds, naming them.....		
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.

SCOTTISH METEOROLOGICAL SOCIETY.

Observations taken at Perth, County of Aberdeen, in Lat. 57° N., Long. 3° 24' W., Height above Sea 110 feet.Distance from Sea 57 miles.During the MONTH of March 1857.

Days of Week.	Days of Month.	BAROMETER.				SELF-REGISTERING THERMOMETERS.				HYGROMETER.				WIND.				RAIN.		CLOUD.	SUNSHINE.	THERMOMETERS under Ground.		Temperature of Spring or Well.	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.		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.					
		29.35		29.34		38.0	39.0			41.3	40.5	40.9	39.7	S.W.	0	S.W.	0		0	6					9.5			
		29.26		29.16		34.0	32.4			39.4	38.9	43.8	41.9	W	0.5	S.W.	1		0	5					8.0			
3		29.09		28.82		44.4	39.4			42.3	39.9	44.4	41.9	S.W.	0.5	S.W.	3		0	5					10.0			
4		28.62		28.89		45.7	30.4			38.8	36.0	31.3	27.8	W	2	W	4		0	5					10		Hail—	
5		28.80		28.54		42.8	29.8			32.3	30.9	39.9	37.0	S.W.	0.5	S.W.	3		0.048	2					9.5			
6		28.56		28.53		42.9	36.7			39.4	36.9	38.8	35.8	S.W.	2	S.W.	2		0.047	5					10		Solar halo	
7		28.41		28.29		39.0	30.7			34.0	32.8	31.0	29.9	S.W.	0.5	S.W.	3		0.155	4					10		Thunder	
8		28.11		28.44		39.0	26.4			30.4	27.6	32.1	31.7	N.W.	2	W	4		0.063	4					10			
9		28.86		28.91		33.4	28.4			32.0	29.3	27.4	26.3	W	4	N.E.	0		0.050	3					10		Lunar halo	
10		28.75		28.60		34.0	12.5			17.5	15.6	31.0	28.9	N.W.	0	S.W.	2		0.010	4					9			
11		28.53		28.71		39.1	29.2			33.0	31.8	30.0	28.1	S.W.	1	S.W.	0		0	5					9.5			
12		28.68		28.57		38.3	20.1			24.6	23.2	34.0	31.8	S.W.	0	S.W.	1		0	0					8.5			
13		28.29		28.04		37.1	33.3			36.2	35.1	36.0	35.4	S	0.5	S.W.	4		0.370	10					10		On the 13-14 th the barometer fell 3 inches in 30 hours & on the 15-16 th it rose again to its original height almost as rapidly—	
14		27.60		27.36		40.5	33.0			33.8	33.2	37.2	35.8	S.E.	4	S.W.	3		0.309	16					10			
15		27.56		27.90		37.0	31.8			33.0	32.3	34.0	33.3	S.W.	4	S.W.	4		0.220	8					10			
16		28.38		28.48		41.0	30.9			35.7	33.4	40.0	37.2	S.W.	1	S.W.	3		0.170	3					10			
17		28.48		28.50		43.8	37.9			39.0	37.3	42.6	40.0	S.W.	1.5	S.W.	1		0.085	2					10			
18		28.50		28.56		44.5	39.3			41.0	39.6	43.0	41.7	S.W.	0.5	S	0		0	9					8			
19		28.68		28.74		43.1	33.5			34.7	34.3	36.4	35.0	W	0	S.E.	0		0.625	10					9			
20		28.85		29.02		41.8	35.4			40.8	39.9	35.9	34.8	S.E.	0	S.E.	1		0.012	10					10			
21		29.15		29.19		35.8	31.4			34.6	31.9	31.9	29.2	S.E.	1	S.E.	2		0.060	10					9			
22		29.09		28.95		38.0	31.2			34.3	31.0	33.5	30.8	S.W.	1	S.E.	2		0	10					9			
23		28.72		28.52		33.3	29.3			29.1	28.5	30.7	30.5	N.E.	1	S.W.	3		0.106	10					10			
24		28.45		28.54		33.8	29.5			31.3	30.1	31.9	30.9	S.W.	0	S.E.	0.5		1.020	10					10			
25		28.53		28.59		35.3	30.5			31.9	31.0	34.5	34.0	N.E.	0	S.W.	0.2		0.096	10					10			
26		28.69		28.82		35.4	32.9			32.5	31.2	34.2	34.0	N.E.	0.2	S.E.	0		0.206	10					10			
27		28.85		28.86		38.4	32.3			35.7	35.0	34.9	34.2	N.E.	0.2	S	0		0.060	10					9			
28		28.86		28.79		41.7	29.0			34.3	33.2	33.0	34.2	N.E.	0	S	0		0.054	10					10			
29		28.64		28.39		37.7	32.2			36.4	34.9	33.9	33.0	S	0	S	1.5		0	5					9			
30		28.15		28.14		40.5	32.2			35.8	35.7	36.5	36.3	S	0	S	0.5		0.185	10					10			
31		28.12		28.27		39.7	35.8			37.2	37.0	36.9	36.2	S	0.5	S	0		0.158	10					10			
Sums.		886.73		886.42		1249.0	97.4			1073.7	103.0	1016.0	105.7	28.4		48.7	22.4	0.090	22.5						29.1		Highest mean 41.0 } Lowest mean 32.5 }	
Means.		28.604		28.594		40.3	31.5			34.6	33.2	33.5	34.1	0.9		1.6		Rain	7.2						9.5			
Index Errors.		-.017		-.017		+0.7	+1.0			-1	-1	-1	-1															
Correc- tion for Diurnal Range.																												
Corrected Means.		28.587		28.577		41.0	32.5			34.5	33.1	33.4	34.0	0.9		1.6			7.2						9.5			
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.),.....= 28.587Column No. 3 (P.M.),.....= 28.577Barometer, Highest observed reading of Month,.....= 29.35Diameter of tube _____ inch; correction for capillarity to be added,.....+ 0.30Capillarity,.....= + 0.30Lowest do. do.,.....= 27.36Sum,.....= 28.617Sum,.....= 28.604Difference, or Monthly Range,.....= 1.99Correction for Temperature from Column No. 3 to be deducted,.....= 11Temp. from Col. 4,.....= 11

Mean

Sum,.....= 28.606Sum,.....= 28.596

28.601

Correction for Height above Sea-level, 110 feet, to add,.....= + 1.250Height,.....= + 1.250

1.250

Barometer corrected and reduced to 32° and Sea-level,.....= 29.856At 32° and Sea-level,.....= 29.846

29.851

Dry bulb Thermometer (mean of Cols. 9 and 11),*.....= 34.9Highest Reading Self-Registering Thermometer,.....= 58° on the 1Wet bulb Thermometer (mean of Cols. 10 and 12),*.....= 33.5Lowest do. do.,.....= 12.5 on the 10† Dew-point Temperature,.....= 31.2Difference, being Monthly Range,.....= 45.5† Elastic Force of Vapour,.....= 0.175Mean of Self-Registering Thermometers,.....= 36.7† Weight of Vapour in a Cubic Foot of Air,.....= 2.0284Mean Daily Range,.....= 8.5† Additional Weight required to Saturate a Cubic Foot,.....= 0.581

Greatest Daily Range,.....=

† Degree of Humidity (Saturation 100),.....= 86

(Signed)

H. Pearce

(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.

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.

Dr. Stark

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. Ayle 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 osseum 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-necked bottle, 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 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 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 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 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 a "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. 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 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. The motion of the higher strata of clouds gives no such indication. Failing 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. 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 dispelling 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 shone 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 with a weight attached, is sunk to the required depth, and in ten minutes drawn up and read. Convenient and cheap instruments are furnished by Messrs. Ayle 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 Depression or Elevation of 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.

Omnia.—Mention whether Schomburgk's or Moffat's scale and papers are used. They may be had at Messrs. Ayle and Son's, 50, Princes Street, and at Mr. Bryson's, 60, Princes Street, Edinburgh. **Electrical.**—Pin 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 grass or seedling-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	Divested of leaves	CROPS, containing variety	Sowing or Ploughing	Appearing above ground	In Bar or Flower	First Out or Harvest
Alder,					Barley,				
Ash,					Beet or Big,				
Beech,					Wheat,				
Birk,					Oats,				
Elm,					Beans,				
Larch,					Peas,				
Lime,					Potatoes,				
Oak,					Tunings,				
Sycamore or Plane,					Rye Grass,				

SHRUBS, ETC.	First in Blossom	FRUITS	First in Blossom	First-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,		Plum,			Swallow,		
Lilac,		Strawberry,			Other birds, naming them,		
Mezereum,					Rail,		
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, Hops, 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,
21, Rutland Street,

DR STARK,

To

Dr. Stark

APR 21 1857

1857

SCOTTISH METEOROLOGICAL SOCIETY.

Observations taken at Macmas, County of Shedden, in Lat. 57° 11', Long. 3° 26' W., Height above Sea 1110 feet.Distance from Sea 57 miles.During the MONTH of April1857.

Days of Week.	Days of Month.	BAROMETER.		SELF-REGISTERING THERMOMETERS.				HYGROMETER.				WIND.				RAIN.		CLOUDS. 1-10.	SUNSHINE.	THERMOMETERS under Ground.		Temperature of SPRING or WELL.	Temperature of SEA.	OZONE. 0-10	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.		9 ^h . A.M.		9 ^h . P.M.				Days on which it fell.	Amount.					
		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.									
1	28.24	28.21	39.8	34.0					36.8	36.4	37.9	36.9	S.	0.5	S.	0	0.060	10							Thunder was heard on the 8 th	
2	28.26	28.36	38.0	36.0					37.6	37.6	35.2	35.0	S.	0.2	S.	0.5	0.053	10							Thunder fell on 3, 5, 6, 7, 11, 12, 13, 24, 25, 26	
3	28.44	28.56	40.2	33.4					35.0	34.8	39.5	39.4	S.W.	0	S.	0	0.650	10							Hail fell on 1, 11	
4	28.65	28.67	40.9	37.1					39.9	39.6	38.5	38.0	S.	0.2	S.	0.5	0.059	10							Very fine on 1, 2, 3, 4, 5, 6, 7, 9, 10.	
5	28.68	28.65	39.0	34.8					36.9	36.2	35.4	35.0	S.	1	S.	0.2	0.252	10								
6	28.59	28.61	39.8	33.2					37.3	37.0	39.0	38.2	S.W.	0.2	S.	0	0.380	10								
7	28.63	28.61	44.0	37.8					39.9	39.5	42.6	41.7	S.	0	S.W.	0	0.153	10								
8	28.53	28.38	50.3	39.4					43.3	41.6	44.3	42.9	S.W.	0.2	S.W.	1	0.07	10								
9	28.40	28.40	51.7	41.2					45.6	43.7	43.1	41.2	S.W.	0	S.W.	0	0.034	10								
10	28.26	28.16	48.0	39.9					45.3	43.6	44.8	39.8	S.W.	0	S.W.	0	0.050	10								
11	28.20	28.12	44.8	33.5					38.0	36.8	36.6	32.2	W.	1	S.W.	0.2	0.062	10								
12	28.06	27.90	41.3	29.4					35.0	32.0	32.2	32.1	S.W.	0.5	S.	0.5	0.022	10								
13	27.97	28.10	40.9	27.8					34.0	32.1	32.9	31.0	W.	0	S.	0	0.207	10								
14	28.14	28.18	44.8	31.5					37.8	34.9	38.2	34.9	S.	0.5	S.W.	0.5	0	10								
15	28.25	28.38	42.0	34.0					38.0	36.1	34.5	32.2	S.W.	1	S.E.	0	0	10								
16	28.50	28.60	45.4	30.5					39.3	34.7	39.5	36.7	W.	0.2	S.W.	0	0	10								
17	28.63	28.48	45.8	27.1					44.1	37.2	44.0	42.1	S.	1	S.	2	0	10								
18	28.58	28.61	52.0	42.3					46.1	43.8	52.0	46.8	S.W.	1	S.W.	2	0.050	10								
19	28.52	28.75	54.6	42.9					48.0	45.6	47.1	43.0	S.W.	1.5	S.W.	3	0.031	10								
20	28.33	28.90	51.5	42.2					48.8	46.7	46.3	41.7	S.W.	2	S.W.	1.5	0.011	10								
21	28.98	28.96	57.2	41.9					46.0	44.7	44.0	41.1	S.W.	1.5	S.W.	0.5	0.028	10								
22	28.86	28.91	48.1	33.8					47.2	44.7	34.0	31.9	S.W.	0.2	S.W.	0.2	0	10								
23	28.35	28.90	41.0	30.0					37.5	34.0	31.0	29.0	S.W.	0.2	S.	0	0	10								
24	28.79	28.65	36.2	27.3					33.8	31.0	33.4	32.5	S.W.	0.5	S.E.	1	0	10								
25	28.56	28.72	39.0	32.0					34.9	32.3	33.3	31.3	S.E.	1	S.E.	0	0.066	10								
26	28.92	28.98	39.0	30.3					35.0	32.1	33.7	31.9	S.W.	0.2	S.W.	0	0.066	10								
27	28.96	28.93	44.8	28.4					38.8	35.9	39.7	36.9	S.E.	0	S.W.	0	0	10								
28	28.82	28.89	42.8	33.8					39.7	38.0	37.9	36.6	S.W.	0.2	S.W.	0.2	0.083	10								
29	28.95	28.94	45.9	29.0					38.6	36.2	37.9	33.7	S.W.	0	S.	0	0	10								
30	28.94	28.91	47.8	33.0					44.9	39.4	44.1	41.2	S.W.	0	S.W.	0	0	10								
31																										
Sums.	857.85	857.42	1331.4	1025.8					1200.4	1129.3	1167.8	1108.9	14.8	13.8	20	2.538	22.5							28.1		
Means.	28.595	28.580	44.4	33.4					40.0	37.6	38.9	36.9	0.50	0.66	Rain	7.5								9.3		
Index Errors.	-0.017	-0.017	-0.2	+0.6					-0.2	-0.2	-0.2	-0.2														
Correc- tion for Diurnal Range.																										
Corrected Means.	28.578	28.563	44.1	34.7					39.8	37.4	38.7	36.7	0.50	0.66		2.538	7.5							9.3		
No. of Column.	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26

Barometer, mean corrected reading of Column No. 1 (A.M.),.....= 28.578 Column No. 3 (P.M.),.....= 28.563 Barometer, Highest observed reading of Month,.....= 28.98
Diameter of tube _____ inch; correction for capillarity to be added,.....+ 0.30 Capillarity,.....= + 0.30 Lowest do. do.,.....= 27.90
Sum,.....= 28.608 Sum,.....= 28.593 Difference, or Monthly Range,.....= 1.08
Correction for Temperature from Column No. 1 to be deducted,.....= - 0.25 Temp. from Col. 3,.....= - 0.20 mean
Sum,.....= 28.583 Sum,.....= 28.573 28.579
Correction for Height above Sea-level, 1110 feet, to add,.....= + 1.250 Height,.....= + 1.250 1250
Barometer corrected and reduced to 32° and Sea-level,.....= 29.835 At 32° and Sea-level,.....= 29.823 29.829

Dry bulb Thermometer (mean of Cols. 9 and 11),*.....= 39.2 Highest Reading Self-Registering Thermometer,.....= 54.6 on the 19
Wet bulb Thermometer (mean of Cols. 10 and 12),*.....= 37.0 Lowest do. do.,.....= 27.1 on the 17
† Dew-point Temperature,.....= 34.1 Difference, being Monthly Range,.....= 27.5
† Elastic Force of Vapour,.....= 197. Mean of Self-Registering Thermometers,.....= 39.4
† Weight of Vapour in a Cubic Foot of Air,.....= 2.28 Mean Daily Range,.....= 9.4
† Additional Weight required to Saturate a Cubic Foot,.....= 82. Greatest Daily Range,.....= 9.4

* 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.

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)

(Designation)

44.13
34.7
722
44.9
34.7
9.4

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 extremity 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," 1849, 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-safe ventilated box with louver-boarded sides, fixed in an exposed place, and it 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 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 thickened 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 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 "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. 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.

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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 with a weight attached, is sunk to the required depth, 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 Depression or Elevation of Barometer*, *Remotable 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*, *Leaving*, 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 every kind), and their indications should be alone noted—always the same plant from year to year being noticed.

Ozone.—Mention whether Schönbein's or Moffat'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, in connection with 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.

OBSERVATIONS IN CONNECTION WITH THE PERIODICAL RETURN OF THE SEASONS.

FOREST TREES.	Flower.	Leaf buds first apparent.	In Leaf.	Divested of Leaves.	CROPS, mentioning season.	Seeds or Planting.	MIGRATORY BIRDS.	First Arrival.	Departure.
Alder,.....					Barley,.....	Apr 23	Cuckoo,.....		
Ash,.....		Apr 12			Beer or Big Oats,.....	Apr 14	House-Swallow,.....		
Beech,.....					Wheat,.....		Lapwing,.....		
Birch,.....					Potatoes,.....		Sand-Martin,.....		
Larch,.....					Pease,.....		Starling,.....		
Lime,.....					Turnips,.....		Swan,.....		
Oak,.....					Rye Grass,.....		Other Birds, naming them—		
Sycamore or Plane,.....									

SHRUBS, ETC.	First in Blossom.	FRUITS.	First in Blossom.	Fruit Ripe generally.
Barberry,.....		Apple,.....		
Bourtree or Elder,.....		Black Currant,.....		
Broom,.....		Cherry,.....		
Hazel,.....		Gean,.....		
Hawthorn,.....		Gosberry,.....		
Holly,.....		Peach,.....		
Laburnum,.....		Pear,.....		
Lilac,.....		Plum,.....		
Mezerion,.....		Strawberry,.....		
Mountain Ash or Rowan,.....	Apr 21			
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.

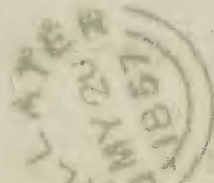
EDINBURGH.

21, Rutland Street,

Sec., Meteorological Society,

DR STARK,

To



March 1857

SCOTTISH METEOROLOGICAL SOCIETY.

Observations taken at Barnard, County of Shropshire, in Lat. 53° 41', Long. 3° 24', Height above Sea 1110 feet.Distance from Sea 57 miles.During the MONTH of May 1857.

Days of Week.	Days of Month.	BAROMETER.				SELF-REGISTERING THERMOMETERS.				HYGROMETER.				WIND.				RAIN.		CLOUD.	SUNSHINE.	THERMOMETERS under Ground.		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.		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.					9 ^h A.M.	9 ^h P.M.				3 inches.	12 inches.
1	28.92		28.92		50.6	36.0			45.3	41.9	43.0	41.0	S.W.	0	S.W.	0.2	0	0	0	0			8					
2	29.00		29.00		63.8	35.3			40.5	36.3	36.3	34.0	S.W.	0.5	S.W.	0	0	0	0	0			10					
3	29.11		29.16		42.5	35.1			37.8	35.5	39.0	35.1	S.W.	1	S.W.	0	0	0	0	0			9					
4	29.15		29.12		48.9	32.6			42.1	39.0	41.7	38.9	S.W.	0.5	S.W.	0.5	0	0	0	0			10					
5	29.14		29.14		57.6	36.2			47.0	40.2	46.0	42.8	S.W.	0.2	S.W.	0.5	0	0	0	0			8					
6	29.14		29.12		53.7	37.1			46.8	43.3	45.0	43.0	S.W.	0	S.W.	0	0	0	0	0			8					
7	29.12		29.05		48.9	36.0			46.7	42.0	41.2	38.1	S.W.	0.2	S.W.	0.2	0	0	0	0			9.5					
8	28.98		28.92		47.2	36.0			40.4	37.8	37.2	36.2	S.W.	1	S.W.	1	0	0	0	0			10	Had				
9	28.88		28.88		44.8	35.2			38.6	37.9	39.4	37.4	S.W.	0.2	S.W.	1	0	0	0	0			10					
10	28.82		28.88		47.9	36.4			42.0	40.0	38.0	34.7	S.W.	1.0	S.W.	0	0	0	0	0			10					
11	28.88		28.88		48.8	36.0			45.9	40.1	41.0	39.0	S.W.	2	S.W.	1	0	0	0	0			9					
12	28.79		28.85		43.0	40.0			41.9	40.3	42.0	40.4	S.W.	0.2	S.W.	1	0	0	0	0			8					
13	28.85		28.39		55.6	41.1			40.7	39.8	50.1	43.8	S.W.	0	S.W.	0	0	0	0	0			9					
14	28.88		28.86		55.2	47.0			50.6	49.0	51.1	49.2	S.W.	0	S.W.	0	0	0	0	0			9					
15	28.87		28.94		61.2	47.3			50.3	50.7	50.2	46.0	S.W.	0.2	S.W.	0	0	0	0	0			9					
16	28.99		28.92		58.8	36.8			53.7	48.7	54.2	50.0	S.W.	0	S.W.	0.5	0	0	0	0			9					
17	28.78		28.79		58.8	43.0			57.2	49.3	48.3	44.0	S.W.	1	S.W.	0.2	0	0	0	0			8					
18	28.69		28.53		53.0	38.1			52.9	48.1	47.0	41.8	S.W.	0.5	S.W.	3	0	0	0	0			10					
19	28.53		28.46		56.9	45.6			52.5	46.4	56.9	53.5	S.W.	4	S.W.	3	0	0	0	0			9					
20	28.36		28.41		58.3	47.3			53.3	48.6	48.1	45.9	S.W.	4	S.W.	1	0	0	0	0			10					
21	28.46		28.39		56.9	45.1			53.5	47.8	48.9	47.0	S.W.	0.5	S.W.	0	0	0	0	0			9					
22	28.53		28.67		56.3	41.4			57.6	45.2	50.4	45.5	S.W.	3	S.W.	1	0	0	0	0			9					
23	28.63		28.56		61.1	38.3			53.5	48.8	44.9	43.4	S.W.	0	S.W.	2	0	0	0	0			8	Thunder				
24	28.40		28.38		63.0	43.2			53.0	57.3	56.7	54.1	S.W.	0.5	S.W.	1	0	0	0	0			10	do				
25	28.49		28.44		64.1	47.2			60.0	52.3	52.4	51.3	S.W.	0	S.W.	0.5	0	0	0	0			9	do				
26	28.50		28.64		56.6	38.1			50.3	49.0	49.0	43.0	S.W.	0.2	S.W.	0.5	0	0	0	0			8					
27	28.70		28.76		48.3	43.6			47.7	47.2	44.7	43.5	S.W.	0.2	S.W.	1	0	0	0	0			10					
28	28.77		28.77		61.0	41.9			52.0	43.6	48.0	46.0	S.W.	0.5	S.W.	1	0	0	0	0			10					
29	28.87		28.94		63.4	43.5			53.0	47.1	49.9	47.1	S.W.	0	S.W.	0.2	0	0	0	0			9					
30	28.96		28.98		59.1	38.3			47.0	45.2	45.9	43.5	S.W.	0.2	S.W.	0.5	0	0	0	0			7.5					
31	29.01		28.98		58.3	36.1			53.1	48.0	49.0	45.2	S.W.	0.5	S.W.	1	0	0	0	0			8					
Sums.	893.22		893.25		1679.5	1229.8			1498.7	1380.4	1435.3	1354.4		22.1		21.8	16	1338	186					281				
Means.	28.815		28.814		54.2	39.4			48.3	44.5	46.3	43.7		0.71		0.70	Rain	6.2						9.				
Index Errors.	-0.17		-0.17		-0.3	+0.4			-0.8	-0.8	-0.8	-0.8																
Correction for Diurnal Range.																												
Corrected Means.	28.798		28.797		53.9	40.0			47.5	43.7	45.5	42.9		0.71		0.70	16	1338	6					9.0				
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.),.....= 28.798 Column No. 3 (P.M.),.....= 28.797 Barometer, Highest observed reading of Month,.....= 29.16
Diameter of tube _____ inch; correction for capillarity to be added,.....+ 0.30 Capillarity,.....= + 0.30 Lowest do. do.,.....= 28.36
Sum,..... 28.818 Sum,..... 28.827 Difference, or Monthly Range,.....= 0.80
Correction for Temperature from Column No. 2 to be deducted, 48.0 = 0.47 Temp. from Col. 2 = 41 Mean
Sum,..... 28.781 Sum,..... 28.786 28.783
Correction for Height above Sea-level, 1110 feet, to add,.....= + 1.250 Height,.....= + 1.250 1.250
Barometer corrected and reduced to 32° and Sea-level,.....= 30.031 At 32° and Sea-level,.....= 30.036 30.033

SUMMARY OF THE WINDS.										
Direction.	N	NE	E	SE	S	SW	W	NW	Calm or Variable.	Mean Force.
A.M.	1	7	4	4	2	10	1	2		0.71
P.M.	—	6	7	4	6	5	1	—		0.70

Dry bulb Thermometer (mean of Cols. 9 and 11),*.....= 46.5 Highest Reading Self-Registering Thermometer,.....= 64.1 on the 25
Wet bulb Thermometer (mean of Cols. 10 and 12),*.....= 43.3 Lowest do. do.,.....= 32.6 on the 4
† Dew-point Temperature,.....= 39.6 Difference, being Monthly Range,.....= 31.5
† Elastic Force of Vapour,.....= 2.44 inches Mean of Self-Registering Thermometers,.....= 46.9
† Weight of Vapour in a Cubic Foot of Air,.....= 2.84 grs Mean Daily Range,.....= 13.9
† Additional Weight required to Saturate a Cubic Foot,.....= 78. Greatest Daily Range,.....= 13.9

* 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.

(Signed) W. H. Pearce
(Designation) _____

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 be 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 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-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 day, 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 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 basin covering it to be often changed. In towns once a month, or oftener, if the weather is dusty, and the basin gets foul; in the country whenever the basin seems to be foul. The bulb should be covered with thin tissue or blotting paper below the basin, and the basin 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 basin, 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. 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 on which a compass may be laid, or by means of a circular 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. The motion of 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. 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 obscuring 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 observations any facts bearing on this point, for a few days (on 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 shone 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 with a weight attached, is sunk to the required depth, 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 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 birds) and their indications should be alone noted—always the same plant from year to year being noticed.

Grass.—Mention whether St. Andrew's or Moffat's scale and papers are used. They may be had at Messrs. Adie and Son's, 30, Princes Street, and at Mr. Bryson's, 60, Princes Street, Edinburgh. *Electricity.*—Fift balls suspended by a silk 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. Exhaled glass or sealing-wax ascertains the nature of the electricity.

OBSERVATIONS IN CONNECTION WITH THE PERIODICAL RETURN OF THE SEASONS.

METEOROLOGICAL RETURNS.									
FOREST TREES.	Flower.	Leaf Buds first appear.	In Leaf.	Divested of Leaves.	CROPS, mentioning variety.	Sowing or Planting.	Appearing above Ground.	In Ear or Flower.	First Cut or Raised.
Alder.....		May 8			Barley.....				
Asht.....		May 12			Beer or Bigg.....				
Beech.....		May 12			Wheat.....				
Birch.....		May 12			Oats.....				
Elm.....		May 12			Peas.....				
Larch.....		May 12			Turnips.....				
Line.....		May 12			Rye Grass.....				
Oak.....		May 12							
Sycamore or Plane.....		May 12							

METEOROLOGICAL RETURNS.									
SILKES, ETC.	First in Blossom.	FRUITS.	First in Blossom.	Fruit Size generally.	MIGRATORY BIRDS.	First Arrived.	Departure.		
Barberry.....	May 27	Apple.....	May 26		Cuckoo.....	May 10			
Bourtree or Elder.....		Black Currant.....	May 22		Curlew.....	"			
Broom.....		Cherry.....	" 20		House-Swallow.....	"			
Hazel.....		Gean.....	" 20		Lapwing.....	"			
Hawthorn.....		Gooseberry.....	" 20		Plover.....	"			
Holly.....		Pear.....	" 20		Sand-Martin.....	"			
Laburnum.....		Plum.....	" 20		Starling.....	"			
Lilac.....		Strawberry.....	" 20		Swan.....	"			
Mezereum.....					Other Birds, naming them.....				
Mountain Ash or Rowan.....									
Red Flowering Currant.....	May 8								
Rhododendron Ponticum.....	May 8								
Whin.....	May 22								

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

DR STARK.

Secy, Meteorological Society,

21, Rutland Street,

EDINBURGH.

SCOTTISH METEOROLOGICAL SOCIETY.

Phacuras, County of *Meriden*, in Lat. *54°*, Long. *3° 24'*, Height above Sea *110* feet.

Distance from Sea *57* miles.

During the MONTH of *June*

185*7*.

Days of Week.	Days of Month.	BAROMETER.		SELF-REGISTERING THERMOMETERS.				HYGROMETER.				WIND.				RAIN.		CLOUD.	SUNSHINE.	THERMOMETERS under Ground.		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.	
		h. A.M.	h. P.M.	Max. in Air.	Min. in Air.	Max. Black bulb in Sun.	Min. Black bulb over Grass.	h. A.M.	h. P.M.	h. A.M.	h. P.M.	Days on which it fell.	Amount.	h. A.M.												
														3 inches.	12 inches.											
																Barometer.	Attach- ed Ther- mometer			Barometer.	Attach- ed Ther- mometer					Dry bulb.
Barometer.	Attach- ed Ther- mometer	Barometer.	Attach- ed Ther- mometer	Dry bulb.	Wet bulb.	Dry bulb.	Wet bulb.	Direction.	Mean Force 1-9.	Direction.	Mean Force 1-9.	days.	inches.	1-10	inches.	12 inches.										
1	28.92	28.83	59.9	36.1	52.9	46.3	48.9	42.8	S.W.	1	S.	0.5	0	0				8								
2	28.79	28.69	61.0	36.0	52.2	47.8	52.9	49.8	S.W.	0.5	S.	0.2	0	0				8								
3	28.69	28.73	57.9	45.6	51.5	47.1	53.6	50.0	S.W.	0.2	S.W.	0.5	0	0				10								
4	28.70	28.83	61.0	49.0	51.7	49.8	56.6	53.8	S.W.	1.0	S.	0.2	0.026	0.026				9	Thunder & lightning							
5	28.76	28.76	65.0	52.1	52.8	52.9	52.2	56.0	S.	1.0	S.W.	0.5	0.129	0.129				10								
6	28.88	28.94	69.0	52.1	52.8	53.9	53.8	53.7	S.W.	1.0	S.W.	0	0.008	0.008				8	Thunder							
7	28.85	28.60	59.0	47.8	56.8	52.0	48.8	47.8	S.	0.2	S.W.	0.5	0	0				9	Fog							
8	28.25	28.30	55.0	45.0	49.1	47.7	48.9	46.8	S.W.	1.0	S.W.	1.5	1.683	1.683				10	Fog							
9	28.45	28.40	52.2	45.0	50.9	47.0	45.7	44.2	W.	0	S.	1	0.040	0.040				10	Fog							
10	28.34	28.47	48.5	42.2	45.6	44.2	45.4	43.1	S.W.	0.2	S.W.	0.2	0.209	0.209				10								
11	28.64	28.86	50.0	39.8	44.0	42.3	40.1	37.5	S.	1	S.W.	0.2	0.034	0.034				8								
12	29.00	29.06	58.3	38.5	48.3	41.4	48.3	43.9	S.W.	0.2	S.	0.5	0	0				9	Some frost which did serious injury to potatoes & fruit							
13	29.04	28.96	57.0	33.2	53.0	47.2	52.0	50.3	S.W.	1.5	S.W.	0.2	0	0				8								
14	28.97	28.96	65.6	46.3	52.9	53.5	57.7	52.0	S.W.	0.5	S.	0.5	0.018	0.018				8								
15	28.97	28.99	64.0	57.0	54.4	53.7	57.0	49.0	S.W.	0.5	S.W.	0.5	0	0				8								
16	29.02	29.06	69.9	42.8	53.7	51.9	60.1	53.3	S.	0.2	S.	0.5	0	0				9								
17	29.09	29.18	71.8	44.4	65.5	54.3	60.0	55.3	S.W.	0.5	S.W.	0	0	0				8								
18	29.24	29.23	76.4	42.1	67.2	57.4	64.3	53.6	S.	0.2	S.W.	0.2	0	0				7								
19	29.20	29.14	73.0	44.8	69.6	56.4	60.5	52.7	S.	0.2	S.W.	0.2	0	0				7								
20	29.11	29.04	72.7	39.9	67.3	53.2	60.3	53.2	S.W.	1.0	S.	0.2	0	0				7								
21	29.02	29.00	72.0	45.8	68.0	57.8	58.4	52.8	S.	0.5	S.	0.5	0	0				7								
22	28.98	29.09	70.1	44.6	67.3	53.8	60.0	60.2	S.W.	0	S.	0.2	0	0				7								
23	29.19	29.15	75.0	53.2	70.1	62.8	65.1	62.2	S.W.	0.2	S.W.	0	0	0				8								
24	29.17	29.23	77.0	55.8	72.1	65.7	64.4	62.4	S.W.	0	S.W.	0	0	0				7	Thunder							
25	29.32	29.32	79.5	59.5	66.9	66.0	66.7	65.0	S.	0	S.W.	0	0	0				8	do							
26	29.21	29.12	78.0	53.2	70.5	62.7	65.2	62.7	S.W.	1	S.W.	0.2	0	0				8	do							
27	29.03	28.90	71.0	57.0	63.7	58.1	61.7	58.0	S.W.	0	S.	0	0	0				8								
28	28.78	28.71	64.0	46.6	62.9	53.8	47.0	46.1	W.	0.5	S.W.	0.5	0	0				9	Fog							
29	28.61	28.58	58.0	40.0	44.4	42.6	42.9	42.0	S.W.	2	S.W.	0.5	0.157	0.157				10								
30	28.63	28.72	60.5	39.7	48.2	44.7	44.8	41.8	S.W.	1	S.W.	0.2	0.460	0.460				10	Some frost, doing serious injury to potatoes &c.							
31																										
Sums.	866.70	866.87	1953.7	1357.1					1760.3	1533.4	1633.3	1520.0	17.1		10.8	10	27.68	130			25.4					
Means.	28.890	28.895	65.1	45.0					58.6	52.7	55.0	57.7	0.57		0.36		4.3				8.5					
Index Errors.	-0.07	-0.07		+0.6					-1.0	-1.0	-1.0	-1.0														
Correction for Diurnal Range.																										
Corrected Means.	28.878	28.878	65.7	45.6					57.6	57.7	54.0	50.7	0.57		0.36		4.3				8.5					
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.),.....= *28.878* Column No. 3 (P.M.),.....= *28.878* Barometer, Highest observed reading of Month,.....= *29.32*
Diameter of tube _____ inch; correction for capillarity to be added,.....+ *0.30* Capillarity,.....= + *0.30* Lowest do. do.,.....= *28.25*
Sum,..... *28.903* Sum,..... *28.908* Difference, or Monthly Range,.....= *1.07*
Correction for Temperature from Column No. 1 to be deducted,.....*38.0* Temp. from Col. 3.....= *0.97* Mean
Sum,..... *28.797* 7/1608 Sum,..... *28.811* *28.804*
Correction for Height above Sea-level, _____ feet, to add,.....= + *1.250* Height,.....= + *1.250* *1.250*
Barometer corrected and reduced to 32° and Sea-level,.....= *30.047* At 32° and Sea-level,.....= *30.061* *30.054*

Dry bulb Thermometer (mean of Cols. 9 and 11),*..... *55.8*
Wet bulb Thermometer (mean of Cols. 10 and 12),*..... *51.2*
† Dew-point Temperature,..... *46.8*
† Elastic Force of Vapour,..... *0.929* m.m.
† Weight of Vapour in a Cubic Foot of Air,..... *3.66* gr.
† Additional Weight required to Saturate a Cubic Foot,.....
† Degree of Humidity (Saturation 100),..... *72*

Highest Reading Self-Registering Thermometer,..... *79.5* on the *25*
Lowest do. do.,..... *28.5* on the *12*
Difference, being Monthly Range,..... *51.0*
Mean of Self-Registering Thermometers,..... *53.3*
Mean Daily Range,..... *28.5* *19.5*
Greatest Daily Range,.....

(Signed) _____

(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.

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.

57.6
54.0
2/1116
55.8

51.7
50.7
2/1024
51.2

65.1
45.6
2/1007
55.3

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 holding 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 *up*, 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 nest-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 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 minutely 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 "Pinning'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. 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 lamblet or village, or of a tall chimney, gives a better indication of the general direction of the wind than any wind-vane. Theobis-verdon states whether he has ascertained the direction by reflection 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 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 dissipating 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 shone 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 with a weight attached, is sunk to the required depth, 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.

Meteor, Aurora Borealis, remarkable Depression or Elevation of Lightning, etc. should be specially noticed, together with the exact hour at which they were first seen, their continuance, and direction. **Building, Leaking, 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 Schönbain's or Moritz's scale and papers are used. They may be had at Messrs. Adie and Son's, 20, 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. Jected 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.	Divided of Leaves.	CROPS mentioning variety.	Swarming or Plucking.	MIGRATORY BIRDS.	First Arrival.	Departure.
Barberry,					Rye Grass,		Cuckoos,		
Bourtree or Elder,					Potatoes,		Curlews,		
Broom,					Pease,		House-Swallows,		
Hazel,					Wheat,		Lapwings,		
Hawthorn,					Oats,		Plover,		
Holly,					Barley,		Sand-Martin,		
Laburnum,					Beet or Pig,		Swan,		
Lilac,							Rail,		
Mezeron,							Other Birds, naming them—		
Mountain Ash or Rowan,									
Rod 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.

DR STARK,

Sec., Meteorological Society,

21, Rutland Street,

EDINBURGH.

SCOTTISH METEOROLOGICAL SOCIETY.

Observations taken at Macmas, County of Shelburne, in Lat. 57° 11', Long. 3° 24' W, Height above Sea 110 feet.

Distance from Sea 57 miles.

During the MONTH of July

185 7

Days of Week.	Days of Month.	BAROMETER.		SELF-REGISTERING THERMOMETERS.				HYGROMETER.				WIND.				RAIN.		CLOUD. p.m. 1-10	SUNSHINE.	THERMOMETERS under Ground.		Temperature of SPRING or WELL.	Temperature of SEA.	OZONE. 0-10	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.		9 ^h A.M.		9 ^h P.M.				Days on which it fell.	Amount.					
		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.									
1	28.78		28.87		62.8	51.5	19.5	57.3	47.0	53.8	49.1	S.W.	0.2	S.	2	0	0.5						8			
2	28.83		28.73		63.9	49.5	22.5	53.3	52.8	54.0	50.0	S.W.	0	S.W.	0.2	0	0						8			
3	28.65		28.61		61.7	47.1	34.9	52.9	51.3	51.3	50.7	S.W.	1.5	S.W.	0	0.010	0						9			
4	28.59		28.55		67.0	50.7	39.5	57.9	53.7	56.0	54.8	N.E.	0	S.W.	0	0.245	0						9			
5	28.49		28.49		57.0	50.2	41.7	54.9	53.4	50.9	50.0	S.W.	0	L	1	0.590	0						8			
6	28.67		28.61		54.3	45.9	39.0	53.4	51.6	46.9	44.7	N.W.	1.5	N.W.	4	0.650	0						9			
7	28.67		28.74		52.0	44.0	34.0	49.2	46.3	49.7	47.1	N.W.	4	N.W.	0.5	0.074	0						10			
8	28.70		28.69		55.0	44.4	34.3	49.9	44.4	46.9	43.2	N	4	N	4	0.009	0						9			
9	28.60		28.61		61.9	44.0	32.9	48.9	45.1	50.9	47.0	N.W.	0.5	N	0	0	0						9			
10	28.64		28.70		63.8	39.8	25.2	57.8	48.2	56.2	54.4	N.W.	0	S.W.	0	0	0						8			
11	28.69		28.84		63.0	52.9	41.2	59.0	55.0	56.1	57.9	S.W.	1	S.W.	0.2	0.023	0						8			
12	28.88		28.96		69.6	52.0	42.5	63.2	58.2	60.9	58.8	S.W.	3	S.	0.5	0	0						8			
13	28.91		29.01		64.9	53.0	35.0	60.7	56.8	56.2	52.1	S.W.	1.5	S.W.	3	0.158	0						8			
14	29.07		28.98		63.3	52.8	41.8	60.0	54.0	57.0	54.1	S.W.	2	S.W.	0	0	0						8			
15	28.81		28.66		65.0	51.3	40.5	60.1	54.3	53.3	50.0	S.W.	2	S.W.	1	0.007	0						9			
16	28.57		28.63		61.7	46.6	35.8	55.0	51.1	56.8	53.3	S.W.	1.5	S.W.	0	0.019	0						9			
17	28.73		28.84		56.0	52.0	30.8	53.7	50.7	53.7	49.9	S.W.	2	S.W.	0.2	0.046	0						8			
18	28.96		29.00		66.5	52.8	30.2	52.0	53.1	59.0	53.0	S.W.	0.2	S.W.	0.2	0	0						8			
19	28.96		28.90		66.3	50.0	37.9	64.6	59.8	61.9	58.3	S.W.	0.2	S.W.	0.2	0	0						8			
20	28.81		28.76		69.0	53.9	47.9	64.3	59.2	54.1	50.9	N	0.5	N	0	0	0						8			
21	28.68		28.70		63.0	47.3	35.0	56.7	53.0	54.8	50.9	S.W.	0.5	S.W.	0	0.047	0						9			
22	28.68		28.74		59.7	47.4	37.8	56.2	51.8	55.3	52.2	S.W.	2.0	S.W.	0	0	0						9			
23	28.63		28.54		62.0	51.4	42.2	58.6	54.9	60.0	57.0	S.W.	0.5	S.W.	3	0	0						9			
24	28.39		28.39		62.0	52.4	25.0	61.0	55.8	53.2	50.9	S.W.	4	S.W.	0.2	0.090	0						10			
25	28.24		28.45		57.0	48.2	27.2	53.9	57.1	53.7	49.8	S.W.	2	S.W.	3	0.066	0						9			
26	28.53		28.52		56.5	49.2	30.0	53.6	49.7	54.9	51.1	S.W.	2	S.W.	2	0.199	0						9			
27	28.42		28.53		61.0	57.3	45.9	53.4	53.0	52.0	48.8	S.W.	0.2	S.W.	0.5	0	0						9			
28	28.66		28.82		60.5	47.3	34.0	53.7	50.0	54.6	50.5	S.W.	1.0	S.W.	1	0.079	0						10			
29	28.84		28.78		64.0	52.8	44.2	58.3	53.6	59.0	53.0	S.W.	1.5	S.W.	1.5	0	0						8			
30	28.61		28.70		63.0	54.3	44.0	58.7	53.4	56.0	50.2	S.W.	1	S.W.	0.5	0.012	0						9			
31	28.65		28.71		66.3	51.0	41.9	56.0	52.4	57.9	53.3	S.W.	1	N.W.	4	0	0						8			
Sums.	889.06		890.12		19218	13008	11223	17502	16312	14960	13930	41.3		32.7	17.2	224	215.3							272		
Means.	28.670		28.713		62.0	48.4	39.4	56.4	52.6	54.7	51.4	1.33		1.05	Rain	6.9								8.8		
Index Errors.	-0.07		-0.07		+6		-1.0	-1.0	-1.0	-1.0														None		
Correction for Diurnal Range.																										
Corrected Means.	28.633		28.696		62.0	49.0	39.4	53.4	51.6	53.7	50.4	1.33		1.05		6.9								8.8		
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

Barometer, mean corrected reading of Column No. 1 (A.M.),.....= 28.653

Column No. 3 (P.M.),.....= 28.696

Barometer, Highest observed reading of Month,.....= 29.07

Diameter of tube _____ inch; correction for capillarity to be added,.....+ 30

Capillarity,.....= + 30

Lowest do. do.,.....= 28.24

Sum,..... 28.683

Sum,..... 28.726

Difference, or Monthly Range,.....= 0.83

Correction for Temperature from Column No. 2 to be deducted, 55° = - 67

Temp. from Col. 53° = - 61

mean

Sum,..... 28.616

Sum,..... 28.665

28.640

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

Height,.....= + 1.250

1.250

Barometer corrected and reduced to 32° and Sea-level,.....= 29.866

At 32° and Sea-level,.....= 29.913

29.890

Dry bulb Thermometer (mean of Cols. 9 and 11)*..... 54.5

Highest Reading Self-Registering Thermometer,..... 69.6 on the 10th

Wet bulb Thermometer (mean of Cols. 10 and 12)*..... 57.0

Lowest do. do.,..... 31.5 on the 1st

† Dew-point Temperature,..... 47.6

Difference, being Monthly Range,..... 38.0

† Elastic Force of Vapour,..... 0.328 inch

Mean of Self-Registering Thermometers,..... 55.5

† Weight of Vapour in a Cubic Foot of Air,..... 3.75 m

Mean Daily Range,..... 13.0

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

Greatest Daily Range,.....

† Degree of Humidity (Saturation 100),..... 77.

(Signed)

[Signature]

(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.

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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 three-fourths or even more of the visible sky without obstructing 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 observations any facts bearing on this point, for a few days (on 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 shone 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 pail, covered with a sloping lid, and with a weight attached, is sunk to the required depth, 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 Depression or Elevation of Barometer, Heavy Boreas, Rain, Hail, Snow, Thunder and Lightning, etc. should be specially noticed, together with the exact hour at which they were first seen, their continuance, and direction.

Building, Laying, and Flowering of Trees.—It is necessary to bear in mind that varieties of the same species of tree differ widely in their kinds 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 Scholten's or Moffat's scale and papers are used. They may be had at Messrs. Adie and Son's, 30, Princes Street, and at Mr. Bryson's, 40, 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.	SHRUBS, ETC.	First in Blossom.	FRUITS.	First in Blossom.	CROPS, mentioning variety.	Sowing or Planting.	Appearing above Ground.	In Ear or Flower.	First Cut or Raised.
Barberry,	Barberry,		Apple,		Rye Grass,				
Bourtree or Elder,	Black Currant,		Cherry,		Turnips,				
Broom,	Gean,		Pear,		Peas,				
Hazel,	Gooseberry,		Peach,		Beans,				
Hawthorn,	Lilac,		Strawberry,		Wheat,				
Holly,	Meacoon,				Oats,				
Laburnum,	Mountain Ash or Rowan,				Barley,				
Lilac,	Red Flowering Currant,				Beer or Big,				
Meacoon,	Rhododendron Ponticum,								
Mountain Ash or Rowan,	Whin,								
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 light, disease, etc. Whether Epizootic disease prevails among Cattle; and the Agricultural condition of the district generally.

METEOROLOGICAL RETURNS

DR STARK

To

Phaenax

21, Rutland Street, EDINBURGH

Sec., Meteorological Society.

SCOTTISH METEOROLOGICAL SOCIETY.

Observations taken at Stranraer, County of Ards, in Lat. 57° 11', Long. 5° 16', Height above Sea 1110 feet.Distance from Sea 57 miles.During the MONTH of August 1857.

Days of Week.	Days of Month.	BAROMETER.		SELF-REGISTERING THERMOMETERS.				HYGROMETER.				WIND.				RAIN.		CLOUD. 1-10	SUNSHINE.	THERMOMETERS under Ground.		Temperature of SPRING or WELL.	Temperature of SEA.	OZONE. 0-10	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.
		h. A.M.		h. P.M.		Max. in Air.	Min. in Air.	Max. Black bulb in Sun.	Min. Black bulb over Grass.	h. A.M.		h. P.M.		Days on which it fell.	Amount.	h. A.M.										
		Barometer.	Attached Thermometer.	Barometer.	Attached Thermometer.					Dry bulb.	Wet bulb.	Dry bulb.	Wet bulb.			Direction.	Mean Force 1-6.			Direction.	Mean Force 1-6.					
		inches.	inches.	*	*	*	*	*	*	Dry bulb.	Wet bulb.	Dry bulb.	Wet bulb.	Direction.	Mean Force 1-6.	Direction.	Mean Force 1-6.			days.	inches.					
1	28.74	28.84		*	71.0	54.6		44.0	63.9	52.4	57.0	53.5	S.W.	1	S.W.	0.2	0	0					8			
2	28.87	28.82			64.8	44.3		28.3	56.0	50.8	56.2	47.8	S.W.	0.5	S.W.	0.	0.007	0.01					9			
3	28.65	28.53			65.8	53.0		44.8	64.8	60.4	63.0	52.3	S.W.	3	S.W.	3.	0.185	0.01					10			
4	28.60	28.76			62.3	51.4		40.2	53.3	50.9	53.0	43.8	S.W.	3	S.W.	0.5	0.068	0.01					10			
5	28.80	28.82			64.1	57.8		31.0	57.2	51.1	56.3	57.8	S.W.	0.5	S.W.	0.5	0	0.01					9			
6	28.82	28.89			57.1	39.4		26.5	53.7	51.4	52.5	49.9	N.	0.5	S.E.	0.2	0	0.01					8			
7	28.84	28.73			53.4	40.0		39.3	53.0	50.4	57.0	47.9	S.E.	1.5	S.E.	3.	0.108	0.01					9			
8	28.71	28.77			53.0	48.7		39.3	53.7	51.2	52.0	49.8	S.E.	0	S.	0.	0	0.01					9			
9	28.77	28.87			64.1	46.2		36.0	54.0	53.0	54.8	52.3	S.W.	0.2	S.W.	0.	0	0.01					8			
10	28.88	28.83			64.1	44.8		31.9	57.3	54.3	60.0	56.8	S.	0.5	S.	0.	0	0.01					9			
11	28.84	28.92			66.1	57.0		46.9	64.1	61.3	58.0	54.4	S.W.	0.5	N.	0.5	0.013	0.01					10			
12	28.96	28.90			66.0	40.7		27.2	60.3	53.3	59.6	57.0	S.W.	0.2	N.	0.	0.049	0.01					8			
13	28.80	28.72			65.1	55.0		45.2	61.0	57.9	57.9	56.8	S.W.	1	S.W.	0.	0.032	0.01					9	Thunder		
14	28.69	28.77			53.1	52.2		42.8	54.5	53.7	56.0	54.8	S.W.	0	S.W.	0.	0.096	0.01					7	Fog		
15	28.79	28.96			64.1	54.2		45.2	61.4	59.5	60.7	59.5	S.E.	0.5	S.E.	0.	0.130	0.01					9			
16	29.03	29.01			73.1	45.7		47.2	60.4	58.7	61.1	59.3	S.W.	0	S.	0.	0.120	0.01					9			
17	29.00	28.97			71.2	49.0		40.5	62.0	53.0	61.5	59.0	S.W.	0	S.E.	0.5	0	0.01					8	Fog		
18	28.96	29.03			72.2	53.0		46.2	61.0	57.9	65.3	60.5	S.W.	0	N.	0.2	0	0.01					9			
19	29.07	29.13			76.5	61.8		57.7	71.6	66.3	67.8	65.8	N.	1	S.W.	0.	0	0.01					8			
20	29.17	29.17			73.2	61.3		53.6	63.3	65.3	64.0	62.5	S.E.	0	S.E.	0.	0.053	0.01					5			
21	29.11	29.09			74.0	61.7		53.0	65.9	64.1	63.3	60.2	S.W.	0	S.	0.	0	0.01					6			
22	29.00	28.95			71.0	46.7		35.7	62.5	56.4	60.0	57.2	S.W.	0	S.	0.2	0	0.01					6			
23	28.94	28.90			72.0	53.7		41.8	64.8	61.3	58.0	53.9	S.E.	0.5	S.E.	0.	0	0.01					8			
24	28.83	28.90			66.2	53.9		40.8	62.2	57.6	57.0	53.3	S.E.	1.5	S.	0.	0	0.01					9	Lightning		
25	28.84	28.84			71.0	45.3		33.2	65.3	59.9	60.3	58.8	S.	0.2	S.W.	0.3	0	0.01					8	Thunder		
26	28.95	29.06			65.3	57.2		48.8	64.9	59.0	58.3	56.0	S.W.	1.5	S.W.	0.1	0.017	0.01					10			
27	29.09	29.19			59.1	52.0		41.8	56.7	54.2	53.0	48.8	S.W.	1.5	N.	0.	0	0.01					8			
28	29.22	29.24			62.5	39.5		26.0	53.7	49.5	50.4	47.9	S.W.	0	S.E.	0.8	0	0.01					8			
29	29.15	29.10			67.0	34.8		21.2	57.7	49.1	52.1	49.8	S.E.	0	S.W.	0.25	0	0.01					6			
30	29.00	28.97			57.2	45.3		24.0	53.4	50.2	54.2	51.2	S.W.	0.5	S.W.	0.2	0	0.01					9			
31	28.90	28.84			65.7	41.3		26.7	56.8	53.3	53.2	52.1	S.E.	0	S.E.	0.	0	0.01					8			
Sums.	896.08	896.44			2035.6	1330.5		2079.1	1350.4	1489.1	1790.6	1703.2		196		13.5	12	1.538	155.7					257		
Means.	28.905	28.917			65.6	49.3		38.9	59.6	56.4	57.7	54.9		0.63		0.43		5.0						8.3		
Index Errors.	-0.17	-0.17			+1.6			-1.0	-1.0	-1.0	-1.0													0.90		
Correction for Diurnal Range.																										
Corrected Means	28.888	28.900			65.6	49.9		38.9	58.6	55.4	56.7	53.9		0.63		0.43		5.0						8.3		
No. of Column.	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26

Barometer, mean corrected reading of Column No. 1 (A.M.),.....= 28.888 Column No. 3 (P.M.),.....= 28.900 Barometer, Highest observed reading of Month,.....= 29.21

Diameter of tube inch; correction for capillarity to be added,.....+ 30 Capillarity,.....= + 30 Lowest do. do.,.....= 28.58

Sum,..... 28.918 Sum,..... 28.930 Difference, or Monthly Range,.....= -0.66

Correction for Temperature from Column No. 2 to be deducted,.....- 80 Temp. from Col. 2.....= 75 mean

Sum,..... 28.838 Sum,..... 28.853 28.840

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

Barometer corrected and reduced to 32° and Sea-level,.....= 30.088 At 32° and Sea-level,.....= 30.103 30.090

SUMMARY OF THE WINDS.										
Direction.	N	NE	E	SE	S	SW	W	NW	Calm or Variable.	Mean Force.
A.M.	1	4	1	5	2	7	1	-		0.63
P.M.	1	2	3	7	4	12	2	-		0.43

Dry bulb Thermometer (mean of Cols. 9 and 11),*.....= 57.6

Wet bulb Thermometer (mean of Cols. 10 and 12),*.....= 54.6

† Dew-point Temperature,.....= 57.9

† Elastic Force of Vapour,.....= 387 mls

† Weight of Vapour in a Cubic Foot of Air,.....= 4.328 m

† Additional Weight required to Saturate a Cubic Foot,.....= 81

† Degree of Humidity (Saturation 100),.....= 81

Highest Reading Self-Registering Thermometer,.....= 71.5 on the 19th

Lowest do. do.,.....= 34.8 on the 29th

Difference, being Monthly Range,.....= 39.7

Mean of Self-Registering Thermometers,.....= 57.7

Mean Daily Range,.....= 15.7

Greatest Daily Range,.....= 15.7

Sunset radiation 21.2. 2.29

(Signed)

J. H. Pearce

(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.

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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 obscuring the sun, 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 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.

Shadows.—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 shone 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 out 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 pichler, covered with a sloping lid, and with a weight attached, is sunk to the required depth, 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 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.

Crops.—Mention whether Schouten's or Moffat'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.**—Fift 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. Exacted glass or sealing-wax ascertains the nature of the electricity.

OBSERVATIONS IN CONNECTION WITH THE PERIODICAL RETURN OF THE SEASONS.

SHRUBS, ETC.	First in Blossom.	FRUITS.	Diseased of Leaves.	CROPS, mentioning variety.	Sowing or Planting.	Appearance above Ground.	In Ear or Flower.	First Cut or Raised.
Barberry,		Apple,		Barley,				
Bouretree or Elder,		Black Currant,		Beet or Rye,				
Broom,		Cherry,		Wheat,				
Hazel,		Gaul,		Oats,				
Hawthorn,		Gooseberry,		Peas,				
Holly,		Pear,		Potatoes,				
Laburnum,		Peach,		Turnips,				
Lilac,		Plum,		Rye Grass,				
Measecon,		Strawberry,						
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 Epidemic disease prevails among Cattle; and the Agricultural condition of the district generally.

METEOROLOGICAL RETURNS.

EDINBURGH.

21, Rutland Street.

Sec., Meteorological Society,

DR STARK,

To

Dr Stark, Edinburgh

SCOTTISH METEOROLOGICAL SOCIETY.

Observations taken at Braemar, County of Shroven, in Lat. 57° 11', Long. 3° 46' W, Height above Sea 1110 feet.

Distance from Sea 57 miles.

During the MONTH of September 1857.

Days of Week.	Days of Month.	BAROMETER.				SELF-REGISTERING THERMOMETERS.				HYGROMETER.				WIND.				RAIN.		CLOUD.	SUNSHINE.	THERMOMETERS under Ground.		Temperature of SPRING or WELLS.	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.		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.					
1	28.68		28.50	59.043.9		29.253.4	49.642.8	46.8	S.W	1.5	4.	1.5	0	1/2												8		
2	28.56		28.63	57.144.8		29.257.1	48.153.8	52.3	N.E	1	4.8	2.0	0.050	1/2												9		
3	28.74		28.73	62.853.2		40.057.9	53.357.1	56.0	N.E	1.5	4.	0.5	0.088	1/2												10		
4	28.58		28.50	59.249.0		41.053.3	53.349.2	48.2	S.	0	4.8	0	1.710	1/2												10	Lightning	
5	28.50		28.58	61.242.9		28.056.0	52.057.0	49.9	S.W	0.5	4.8	0	0	1/2												8	Thunder	
6	28.52		28.60	53.744.2	67.229.0	52.852.0	52.850.9	4.	0	S.W	0	0	0.101	1/2												8		
7	28.62		28.62	57.348.5	71.234.4	56.952.5	50.749.3	4.9	0.2	S.W	0.5	0	0.063	1/2												9		
8	28.56		28.45	57.137.2	81.223.0	47.847.0	54.452.8	4.8	0	N.E	0.2	0	0.036	1/2												8		
9	28.26		28.53	62.052.0	78.039.4	59.058.2	53.553.1	4.8	0	N.E	0	0	1.857	1/2												6		
10	28.62		28.69	60.152.9	65.838.2	57.356.6	56.553.3	4.8	0.5	S.	0.2	0	0.160	1/2												10		
11	28.67		28.55	56.148.0	64.055.0	53.948.6	46.544.5	4.8	1	N.E	0.5	0	0.210	1/2												10		
12	28.58		28.58	58.747.0	70.033.8	58.756.2	57.055.9	4.8	0.5	N.E	0.5	0	0.273	1/2												9		
13	28.67		28.79	62.053.8	82.842.0	57.356.7	53.952.2	4.8	0.2	N.E	0	0	0.300	1/2												10		
14	28.32		28.90	66.039.2	86.025.4	66.746.1	56.953.3	4.11	0	S.W	0	0	0	1/2												5	Fog	
15	28.90		28.87	63.352.5	77.028.0	59.957.9	66.261.5	4.11	1	S.W	1.5	0	0	1/2												9		
16	28.57		28.92	65.359.1	82.046.7	61.858.2	61.959.1	4.11	3	S.W	1	0	0.010	1/2												9		
17	28.86		28.89	63.853.3	86.046.3	62.857.9	53.150.9	4.11	1.5	S.W	3	0	0	1/2												9		
18	29.01		29.21	57.245.2	83.237.2	56.050.7	62.845.2	4.11	3	N.E	3	0	0	1/2												9		
19	29.32		29.29	61.337.0	90.020.3	64.243.2	66.945.6	4.11	0	0	0	0	0	1/2												8		
20	29.22		29.22	62.940.7	87.823.0	55.051.5	50.448.5	4.11	0	S.W	0.2	0	0	1/2												8		
21	29.20		29.20	60.049.0	67.031.0	57.754.7	53.753.8	4.11	0.5	4.8	0	0	0	1/2												8		
22	29.14		29.04	61.747.0	88.633.0	53.051.2	48.045.0	4.11	0.2	S.W	0.5	0	0	1/2												8		
23	29.00		28.90	56.146.8	88.529.8	52.950.0	53.850.9	4.11	1	S.W	1	0	0	1/2												9		
24	28.71		28.54	58.550.7	66.557.2	53.555.0	53.256.9	4.	1.5	S.	1.5	0	0	1/2												8		
25	28.53		28.61	53.350.0	60.039.0	54.851.9	52.348.5	4.11	1.5	S.W	3	0	0.160	1/2												10		
26	28.54		28.41	57.846.9	66.332.3	50.947.9	57.855.0	4.11	5	S.W	5	0	0	1/2												9		
27	28.36		28.40	57.246.9	72.234.8	55.852.2	57.849.0	4.11	1	S.W	2	0	0.060	1/2												9		
28	28.47		28.62	53.346.0	73.634.5	52.949.6	47.044.9	4.11	3	S.W	0	0	0.080	1/2												9		
29	28.80		28.90	56.745.5	84.230.2	57.348.0	46.144.9	4.11	1.5	S.W	0	0	0	1/2												9		
30	28.80		28.80	53.343.3	59.229.2	54.057.0	54.353.0	4.11	0.5	S.W	1	0	0	1/2												8		
31																												
Sums.	862.13		862.54	1778.244.5		1015.744.3	1570.659.8	1539.4		31.1			28.6	1833.66	200												259	
Means.	28.737		28.757	59.247.1		33.854.7	52.353.2	57.3		1.03			0.95	Rain 6.6													8.6	
Index Errors.	-0.17		-0.17																									
Correction for Diurnal Range.†																												
Corrected Means.	28.720		28.734	59.247.7		33.853.7	57.352.2	50.3		1.03			0.95	6.6													8.6	
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		

Barometer, mean corrected reading of Column No. 1 (A.M.),.....= 28.720
Diameter of tube _____ inch; correction for capillarity to be added,.....+ 30
Sum,..... 28.750
Correction for Temperature from Column No. 2 to be deducted,.....- 64
Sum,..... 28.686
Correction for Height above Sea-level, 1110 feet, to add,.....+ 1.250
Barometer corrected and reduced to 32° and Sea-level,.....= 29.936

Column No. 3 (P.M.),.....= 28.734
Capillarity,.....+ 30
Sum,..... 28.764
Temp. from Col. 2.....= 58
192 Sum,..... 28.706
Height,.....+ 1.250
At 32° and Sea-level,.....= 29.956

Barometer, Highest observed reading of Month,.....19.....= 29.32
Lowest do. do.,.....P.....= 28.26
Difference, or Monthly Range,.....= 1.06

SUMMARY OF THE WINDS.												Calm or Variable.	Mean Force.
Direction.	N	NE	E	SE	S	SW	W	NW	Calms	Variable.	Mean Force.		
A.M.	1	7	-	-	2	17	1	2			1.03		
P.M.	1	8	2	2	2	14	1	0			0.95		

Dry bulb Thermometer (mean of Cols. 9 and 11),*..... 52.9
Wet bulb Thermometer (mean of Cols. 10 and 12),*..... 50.3
† Dew-point Temperature,..... 47.7
† Elastic Force of Vapour,..... 0.332 in.
† Weight of Vapour in a Cubic Foot of Air,..... 3.71 gr
† Additional Weight required to Saturate a Cubic Foot,.....
† Degree of Humidity (Saturation 100),..... 83

Highest Reading Self-Registering Thermometer,..... 65.3 on the 16th
Lowest do. do.,..... 37.0 on the 19th
Difference, being Monthly Range,..... 28.3
Mean of Self-Registering Thermometers,..... 53.4
Mean Daily Range,..... 11.5
Greatest Daily Range,.....

Highest in Sun 90° on 18th
Lowest in Night - 20.3 on 19

(Signed) Thos Pearce
(Designation)

* If the readings are taken at 0° and 32°, 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 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 osbern 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 purposes, 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 sunshining, 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 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 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 powdered 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 powdered 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 "Planning'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. 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 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 motion of the higher strata of clouds gives no such indication. Failing the clouds, the general direction of the smoke of a handle or village, or of a tall chimney, gives a better indication of the general direction of the wind than a wind-vane. The observer should state whether he has ascertained the direction by reflection from 0 to 0, 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 dissipating 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 shone 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 with a weight attached, is sunk to the required depth, 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.

Metecors, Aurore Borealis, Remarkable Depression or Elevation of Barometer, Remarkable Falls of Rain, Heat 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.

Orons.—Mention whether Schomburgk's or Moritz'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.*—Rith 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. Excited 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.	Directed of Leaves.	CROPS, mentioning variety.	Sowing or Planting.	Appearing above Ground.	In Ear or Flower.	First Cut or Raised.
Alder,.....					Barley,.....				Sept 1
Ash,.....					Beer or Big,.....				
Beech,.....					Oats,.....				
Birch,.....					Wheat,.....				
Elm,.....					Beans,.....				
Larch,.....					Pease,.....				
Lime,.....					Potatoes,.....				
Oak,.....					Turnips,.....				
Sycamore or Plane,.....					Rye Grass,.....				
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,.....		Sept 20	Curlew,.....				
Broom,.....		Cherry,.....			House-Swallow,.....				
Hazel,.....		Gean,.....			Lapwing,.....				
Hawthorn,.....		Gooseberry,.....			Plover,.....				
Holly,.....		Peach,.....			Sand-Martin,.....				
Laburnum,.....		Pear,.....		Sept 20	Starling,.....				
Lilac,.....		Plum,.....		Sept 20	Swan,.....				
Mezerion,.....		Strawberry,.....			Rail,.....				
Mountain Ash or Rowan,.....					Other Birds, naming them—				
Red Flowering Currant,.....									
Rhododendron Ponticum,.....									
Whin,.....									

Have the goodness also to state any information you may be able to collect relative to the Crois 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.

21, Rutland Street,

EDINBURGH.

SCOTTISH METEOROLOGICAL SOCIETY.

Observations taken at Maunabo, County of Honolulu, in Lat. 51° 4', Long. 3° 24' W, Height above Sea 1110 feet.Distance from Sea 57 miles.During the MONTH of October 1857.

Days of Week.	Days of Month.	BAROMETER.		SELF-REGISTERING THERMOMETERS.				HYGROMETER.				WIND.				RAIN.		CLOUD.	SUNSHINE.	THERMOMETERS under Ground.		Temperature of SPRING or WELL.	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.				
		h. A.M.		h. P.M.		Max. in Air.	Min. in Air.	Max. Black bulb in Sun.	Min. Black bulb over Grass.	h. A.M.		h. P.M.		h. A.M.		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.	
																											inches.	inches.	inches.	inches.
1	28.80	28.66	58.8	47.2	79.2	23.7	56.7	54.1	49.0	46.9	S.W.	0.2	S.W.	2	0.019	4						10								
2	28.73	28.37	57.0	45.7	61.7	31.5	57.1	47.9	57.5	55.5	S.W.	1	S.W.	5	0.023	11.5						9								
3	28.55	28.57	57.0	40.5	74.0	28.7	47.3	43.4	41.8	39.6	N.W.	3	S.W.	2	0.063	6						10								
4	28.48	28.37	48.5	36.9	72.5	20.3	43.0	40.5	38.2	36.8	N.W.	1	S.W.	0	0	6						8								
5	28.31	28.28	45.8	31.8	67.0	14.8	43.0	41.1	40.7	39.1	S.W.	1	S.W.	0.5	0	6						10								
6	28.28	28.36	48.0	37.5	67.5	23.2	42.6	44.0	42.2	40.0	N.W.	3	S.W.	0.5	0.077	7						10								
7	28.36	28.25	49.0	30.6	83.8	14.0	35.9	35.1	44.3	42.8	S.W.	0	S.	0.5	0	7						10								
8	28.13	28.11	48.8	43.2	46.9	0.30	54.7	46.9	49.2	48.7	N.E.	5	N.E.	0.5	0.154	10						10								
9	28.16	28.35	50.8	43.4	57.8	34.0	48.2	47.1	43.4	42.8	S.W.	0	N.W.	0	0.180	10						10								
10	28.18	28.54	52.9	31.7	79.0	16.0	35.3	35.1	46.2	44.9	N.W.	0	S.W.	0	0	8						6								
11	28.60	28.78	53.8	45.0	77.4	31.8	57.3	49.8	46.3	45.0	S.W.	0	S.W.	0	0.013	8						8								
12	28.89	28.76	53.8	39.7	86.2	22.6	54.4	54.7	56.5	54.5	S.W.	0.2	S.W.	3	0	8						8								
13	28.95	29.00	53.7	45.0	85.3	33.4	49.9	47.8	44.8	43.9	S.W.	0.2	S.W.	0.2	0.009	9						10								
14	28.93	28.95	56.7	44.4	77.0	28.0	53.9	52.8	50.7	48.9	S.W.	0.5	S.W.	0	0.009	9						8	Fog							
15	28.89	28.93	55.3	41.1	64.0	25.3	52.9	51.7	49.8	48.6	S.W.	0.2	S.W.	0.2	0	9						8	Fog							
16	28.96	28.86	50.1	47.2	57.8	33.2	48.1	47.9	50.1	48.7	N.E.	0.5	N.E.	0.5	0.010	10						10								
17	28.68	28.57	53.8	49.0	53.8	35.9	52.1	52.9	52.9	50.3	S.	0.5	S.W.	1	0.093	10						10								
18	28.48	28.53	53.7	49.0	70.8	36.5	57.3	50.2	49.9	48.7	S.W.	0.5	S.	0	0.039	10						10								
19	28.60	28.75	56.2	37.7	85.0	23.0	38.3	38.2	43.7	43.2	S.E.	0	S.	0	0	10						6	Fog							
20	28.75	28.57	52.6	30.4	74.6	22.2	34.6	24.6	49.0	46.0	S.	0.5	S.W.	0.2	0	10						7								
21	28.57	28.53	48.5	35.5	63.7	22.5	41.7	40.0	35.0	34.0	S.W.	0.5	S.W.	0	0	10						9								
22	28.66	28.89	45.0	25.7	76.8	10.0	37.8	32.6	39.9	38.2	S.W.	0	N.E.	2.	0	10						7								
23	29.05	29.16	42.9	36.5	90.3	32.3	38.3	36.9	44.7	40.7	N.	1.5	N.E.	0	0.120	10						10								
24	29.21	29.18	52.7	33.4	85.0	19.9	35.5	35.4	35.8	34.9	S.E.	0	S.W.	0	0	10						8	Humid clouds seen							
25	29.05	28.91	47.2	28.8	73.0	14.0	34.0	33.8	48.0	44.9	S.W.	0	N.E.	0.5	0	10						6								
26	28.80	28.72	48.0	45.0	49.2	32.6	46.9	46.3	48.4	48.2	S.E.	0	S.E.	0.2	0.016	10						10	Fog							
27	28.64	28.64	57.2	47.1	57.2	34.0	49.5	48.6	57.5	49.4	S.	0.5	S.E.	0.2	0.147	10						10								
28	28.71	28.75	53.0	47.3	61.0	33.8	57.0	49.8	44.2	46.5	S.	0.5	S.W.	0.2	0.158	10						9								
29	28.53	28.34	48.2	44.2	50.5	31.6	47.2	45.9	45.7	43.6	S.W.	1	S.W.	3	0.000	10						10								
30	28.50	28.57	45.7	37.7	65.5	22.0	41.1	39.6	40.6	39.0	S.W.	1	S.W.	1	0.007	10						10								
31	28.66	28.59	47.4	38.3	53.0	24.5	45.8	43.1	46.2	43.4	S.W.	1.5	S.W.	1.5	0.010	10						10								
Sums.	888.34	887.78	1592.3	1234.1	2143.1	809.6	1410.6	1367.4	1427.5	1377.7		23.8		24.7	18.1	29.8	19.45						24.7							
Means.	28.656	28.638	57.3	39.8	69.0	29.3	45.5	44.1	46.0	44.5		0.77		0.80	Rain	6.2							8.9							
Index Errors.	-0.017	-0.017	-	-	-	-	-	-	-	-													0.204							
Correc- tion for Diurnal Range.																														
Corrected Means.	28.639	28.621	57.3	40.4	69.1	29.3	44.7	43.3	45.2	43.7		0.77		0.80		6.2							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				

Barometer, mean corrected reading of Column No. 1 (A.M.),.....= 28.639 Column No. 3 (P.M.),.....= 28.621
Diameter of tube _____ inch; correction for capillarity to be added,.....+ 30 Capillarity,.....= + 30
Sum,..... 28.669 Sum,..... 28.657
Correction for Temperature from Column No. 3 to be deducted,.....= - 38 Temp. from Col. 3.....= - 38
Sum,..... 28.631 Sum,..... 28.613
Correction for Height above Sea-level, 1110 feet, to add,.....= + 1.250 Height,.....= + 1.250
Barometer corrected and reduced to 32° and Sea-level,.....= 29.881 At 32° and Sea-level,.....= 29.863

Dry bulb Thermometer (mean of Cols. 9 and 11),..... 44.9
Wet bulb Thermometer (mean of Cols. 10 and 12),..... 43.5
† Dew-point Temperature,..... 41.8
† Elastic Force of Vapour,..... 2.65 inches
† Weight of Vapour in a Cubic Foot of Air,..... 3.06 grs
† Additional Weight required to Saturate a Cubic Foot,.....
† Degree of Humidity (Saturation 100),..... 90.

Highest Reading Self-Registering Thermometer,..... 58.8 on the 19th
Lowest do. do.,..... 25.2 on the 23
Difference, being Monthly Range,..... 33.6
Mean of Self-Registering Thermometers,..... 45.8
Mean Daily Range,..... 10.9
Greatest Daily Range,.....

SUMMARY OF THE WINDS.										
Direction.	N	NE	E	SE	S	SW	W	NW	Calm or Variable.	Mean Force.
A.M.	1	4	1	2	4	15	3	1		
P.M.	-	5	2	2	1	20	1	-		

(Signed)

The Seave

(Designation)

* 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 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 wiped 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. Differing contrivances are used for this purpose, either a double ventilated box with wire-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 near-side ventilated box with board-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 moist covering it to be often changed. In towns once a month, or oftener, if the weather is dusty, and the moisten gets foul; in the country whenever the moisten seems to be foul. The bulb should be covered with thin tissue or blotting paper below the moisten, and the moisten 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 moisten, the evaporation from the ice going on as from the simply wetted bulb.

Lean 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. 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 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. The motion of the higher strata of clouds gives no such indication. Fanning the clouds, the general direction of the smoke of a handle or chimney, 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 the smoke is confirmed the direction by reflection or otherwise. It is generally agreed to reckon the force of the wind from 0 to 5; 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 dissipating 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 shone 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 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. 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, Removable Depression or Elevation of Lightning, etc. should be specially noticed, together with the exact hour at which they were first seen, their continuance, and direction. *Building, 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.

Grass.—Mention whether Schönbein's or Moffat'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.*—Fris 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 grass or settling-wax ascertains the nature of the electricity.

OBSERVATIONS IN CONNECTION WITH THE PERIODICAL RETURN OF THE SEASONS.

SHRUBS, ETC.	First in Blossom.	FRUITS.	First in Blossom.	CROPS, mentioning variety.	Spring or Planting.	Appearing above Ground.	In Ear or Flower.	First Cut or Raised.
Burberry,		Apple,		Barley,				
Bourtree or Elder,		Black Currant,		Beer or Big,				
Broom,		Cherry,		Oats,				
Hazel,		Gooseberry,		Peas,				
Hawthorn,		Peach,		Potatoes,				
Holly,		Pear,		Turnips,				
Laburnum,		Strawberry,		Rye Grass,				
Mezerion,								
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, diseases, etc. Whether Epizootic disease prevails among Cattle; and the Agricultural condition of the district generally.

METEOROLOGICAL RETURNS.

Sec., Meteorological Society.

21, Rutland Street.

EDINBURGH.

OCTOBER 1857

RECEIVED
NOV 11 1857

EDINBURGH
NOV 12 1857

SCOTTISH METEOROLOGICAL SOCIETY.

Observations taken at Braemar, County of Highland, in Lat. 57° 11', Long. 3° 24', Height above Sea 1100 feet.

Distance from Sea 57 miles. During the MONTH of December 1857.

Days of Week.	Days of Month.	BAROMETER.		SELF-REGISTERING THERMOMETERS.				HYGROMETER.				WIND.		RAIN.		CLOUD. 1-10	SUNSHINE.	THERMOMETERS under Ground.		Temperature of SEA.	OZONE. 0-10	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.				
		h. A.M.		h. P.M.		Max. in Air.	Min. in Air.	Max. Black bulb in Sun.	Min. Black bulb over Grass.	h. A.M.		h. P.M.		Direction.	Mean Force 1-6.			Direction.	Mean Force 1-6.					Days on which it fell.	Amount.	h. A.M.	
		Barometer.	Attached Thermometer.	Barometer.	Attached Thermometer.					Dry bulb.	Wet bulb.	Dry bulb.	Wet bulb.													3 inches.	12 inches.
1		28.48	28.46	52.2	44.8	52.2	32.7	52.3	50.5	50.4	49.2	S.W.	3	S.W.	4	0	0						Lightning				
2		28.40	28.40	50.5	45.6	49.0	37.0	47.3	45.8	49.5	48.1	S.W.	0.5	S.W.	1	0.03	0										
3		28.60	28.84	50.0	32.4	80.0	25.8	41.2	38.9	32.4	31.4	S.W.	0.5	W	0	0.50	0										
4		28.80	28.85	40.8	24.0	48.7	8.8	27.7	27.5	39.0	37.9	W	0	E.	0	0	0										
5		28.76	28.77	43.2	35.3	41.5	22.0	36.9	36.7	41.6	40.8	S.	0	E.	0	0.10	0										
6		28.74	28.88	51.0	39.2	80.0	26.8	40.0	39.5	42.3	41.1	S.W.	0	S.W.	0.5	0.06	0										
7		28.95	29.05	44.0	27.0	41.0	11.5	24.7	27.2	40.9	40.2	S.W.	0	S.W.	0.2	0	0							Hygrometer in 9.10.14.15.16			
8		29.06	29.10	48.6	40.0	50.0	29.4	47.3	46.2	46.5	45.8	S.W.	0.2	S.W.	0	0	0										
9		29.19	29.34	47.0	39.0	53.8	25.0	41.1	40.9	44.2	43.2	S.W.	0	S.E.	0.2	0.58	0										
10		29.44	29.50	45.2	42.0	48.9	29.0	43.9	43.5	44.6	43.0	S.E.	0	S.W.	0	0	0										
11		29.53	29.56	44.5	41.7	46.8	31.0	44.1	44.9	42.0	40.0	S.W.	0.5	S.W.	0.2	0	0										
12		29.50	29.40	46.9	30.5	36.0	15.0	30.8	30.4	40.2	39.0	S.W.	0	S.W.	0.2	0	0										
13		29.33	29.37	56.0	39.0	83.1	24.0	57.8	49.4	57.9	50.4	S.W.	0	S.W.	0	0	0										
14		29.33	29.29	52.0	46.2	53.7	33.0	44.9	43.8	48.6	48.5	E.	0	S.W.	0	0	0										
15		29.27	29.25	49.0	42.0	52.0	33.0	44.6	46.3	42.9	42.2	S.	0	S.	0	0	0										
16		29.26	29.26	46.2	40.8	48.1	28.0	43.4	43.0	45.1	44.4	S.E.	0.2	S.E.	0	0	0										
17		29.16	29.15	45.9	41.8	53.0	28.0	44.0	43.0	45.1	43.8	S.E.	1.5	E.	0.5	0.27	0										
18		29.18	29.18	46.3	39.8	46.5	30.3	46.9	45.3	42.7	42.7	S.E.	1	S.	1	0.52	0								Barometer exposed to the air		
19		29.09	28.97	46.2	41.9	66.2	27.8	45.2	43.8	45.0	43.5	S.	2	S.W.	1.5	0	0								Barometer exposed to the air		
20		28.85	28.95	49.9	43.6	67.1	29.2	48.3	46.5	46.1	43.5	S.W.	1.5	S.W.	1.5	0.04	0								Barometer exposed to the air		
21		28.95	28.87	47.2	41.4	68.0	27.8	46.2	43.8	42.1	40.0	S.W.	0.5	S.W.	0.2	0	0								Barometer exposed to the air		
22		28.72	28.46	49.7	40.1	49.7	24.6	42.9	42.2	48.1	47.0	S.W.	0	S.W.	0	0.02	0								Barometer exposed to the air		
23		28.04	28.05	48.3	32.6	48.2	29.0	42.0	41.5	33.8	33.3	E.	0	W.	3	2.84	0								Barometer exposed to the air		
24		28.17	28.30	33.9	27.8	40.0	14.3	28.8	27.6	28.8	27.1	S.E.	0.5	S.W.	1	1.085	0								Barometer exposed to the air		
25		28.43	28.43	34.9	27.2	35.9	17.0	34.9	33.2	30.9	29.9	S.W.	0	S.W.	0	0.037	0								Barometer exposed to the air		
26		28.46	28.84	37.2	21.0	39.7	4.0	28.7	27.6	35.8	34.7	S.W.	0	S.E.	0	0	0								Barometer exposed to the air		
27		29.00	29.00	36.0	29.0	65.0	4.6	30.0	29.5	28.8	27.9	S.W.	0	S.W.	0	0.037	0								Barometer exposed to the air		
28		28.94	28.92	39.0	28.8	67.2	11.8	30.9	30.1	34.8	31.0	W	0.2	S.W.	0	0	0								Barometer exposed to the air		
29		28.94	28.94	37.5	25.2	40.1	11.0	27.0	27.0	34.9	32.9	W	0	S.W.	0	0	0								Barometer exposed to the air		
30		28.89	28.72	41.5	25.2	41.5	10.5	38.2	36.8	42.0	40.6	S.W.	1	S.W.	0	0	0								Barometer exposed to the air		
31																										Barometer exposed to the air	
Sums.		867.46	868.10	1360.5	1074.9	1742.4	682.3	1205.2	1174.5	1229.0	1195.1		16.1		15.0	3.375	222								262		
Means.		28.915	28.936	45.3	33.8	58.0	22.7	40.1	39.1	44.0	39.8		0.53		0.50	7.4									8.7		
Index Errors.		-0.017	-0.017	0.0	+0.9					-0.5	-0.5	-0.5	-0.5														
Correction for Diurnal Range.																											
Corrected Means.		28.898	28.919	45.3	34.7	58.0	22.7	39.6	38.6	40.5	39.3		0.53		0.50	7.4									8.7		
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

Barometer, mean corrected reading of Column No. 1 (A.M.),.....= 28.898 Column No. 3 (P.M.),.....= 28.919 Barometer, Highest observed reading of Month,.....= 29.56
Diameter of tube _____ inch; correction for capillarity to be added,.....+ 30 Capillarity,.....= + 30 Lowest do. do.,.....= 28.04
Sum,.....= 28.928 Sum,.....= 28.949 Difference, or Monthly Range,.....= 1.57
Correction for Temperature from Column No. 3 to be deducted,.....= 0.23 Temp. from Col. 3.....= 0.23 Sum,.....= 28.905 Sum,.....= 28.942 Mean.....= 28.938
Sum,.....= 28.905 Sum,.....= 28.942 Height,.....= + 1.250 Height,.....= + 1.250 At 32° and Sea-level,.....= 30.153 At 32° and Sea-level,.....= 30.222

Dry bulb Thermometer (mean of Cols. 9 and 11),.....= 40.0 Highest Reading Self-Registering Thermometer,.....= 56.0 on the 13
Wet bulb Thermometer (mean of Cols. 10 and 12),.....= 38.9 Lowest do. do.,.....= 24.0 on the 26
† Dew-point Temperature,.....= 37.3 Difference, being Monthly Range,.....= 35.0
† Elastic Force of Vapour,.....= 23.4 Mean of Self-Registering Thermometers,.....= 41.0
† Weight of Vapour in a Cubic Foot of Air,.....= 22.4 Mean Daily Range,.....= 8.6
† Additional Weight required to Saturate a Cubic Foot,.....= 95.91 Greatest Daily Range,.....= 8.6

* 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.

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.

(Signed) W. Pearce
(Designation) _____
79.6 38.6 45.3 8.6
28.9 38.9 36.7
28.0 38.9 32.0
41.0

INSTRUCTIONS FOR MAKING METEOROLOGICAL OBSERVATIONS.

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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," 1849, 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 neat-state 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 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 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 "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. 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 joy 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. The motion 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. 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 obscuring the sunshiny, so that the indications noted in the column for clouds would not necessarily express, or agree with, the column for sunshiny. 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 shone 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 with a weight attached, is sunk to the required depth, 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.

Meters, Anemometers, Barometers, 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 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 Moffat'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.**—Pin 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. Excited 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	Dressed of Leaves	CROPS, mentioning variety.	Sowing or Planting	MIGRATORY BIRDS	First Arrival	Departure
SHRUBS, ETC.									
Barberry,			Apple,				Cuckoo,		
Bourtree or Elder,			Black Currant,				Curlew,		
Broom,			Cherry,				Horse-Swallow,		
Hazel,			Gent,				Lapwing,		
Hawthorn,			Gooseberry,				Plover,		
Holly,			Peach,				Sand-Martin,		
Laburnum,			Plum,				Swan,		
Lilac,			Strawberry,				Other Birds, naming them—		
Mezereum,							Rail,		
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.

EDINBURGH.

21, Rutland Street,

Sec., Meteorological Society,

DR STARK,

To

RECEIVED
NOV 24 1857

EDINBURGH
NOV 24 1857

NOVEMBER 1857

SCOTTISH METEOROLOGICAL SOCIETY.

Observations taken at Barrow, County of Shannon, Lat. 54°, Long. 2° 24', Height above Sea 140 feet.

Distance from Sea 57 miles.

During the MONTH of December 1857.

Days of Week.	Days of Month.	BAROMETER.		SELF-REGISTERING THERMOMETERS.				HYGROMETER.				WIND.				RAIN.	CLOUD.	MOONSHINE.	THERMOMETERS under Ground.		Temperature of SPRING or WELL.	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.	Dry bulb.	Wet bulb.	Dry bulb.	Wet bulb.	Direction.	Mean Force 1-6.				Direction.	Mean Force 1-6.						Days on which it fell.	Amount.	3 inches.	12 inches.		
																														h. A.M.	
																														inches.	inches.
1	28.50	28.57	42.0	38.2	42.0	25.8	39.1	37.6	41.2	40.2	2.11	1	SW	0	0.008							10									
2	28.61	28.41	57.2	40.6	57.2	25.3	41.5	40.1	57.9	50.5	"	0	"	4	0	0.043						9									
3	28.20	28.03	57.5	48.5	57.5	35.8	50.0	48.9	48.9	46.7	"	5	"	6	0.343							10									
4	28.46	28.60	43.6	34.5	43.6	20.0	35.3	33.8	40.8	38.6	"	0.5	"	3	0.378							10									
5	28.65	28.66	45.7	39.5	45.7	25.5	41.2	40.0	45.6	42.4	"	0.2	"	4	0.180							10									
6	28.75	28.71	49.0	44.0	49.0	32.2	42.0	38.9	48.0	46.9	"	1	"	5	0.365							10									
7	28.83	28.80	51.2	40.5	51.2	29.0	45.1	42.0	40.5	38.1	"	1.5	"	4	0							10									
8	29.12	29.02	49.0	39.0	49.0	25.3	41.4	39.1	49.9	47.6	"	1.5	"	1	0.330							10									
9	28.93	28.72	50.2	44.8	50.2	33.5	47.5	43.9	46.8	44.8	"	4	"	4	0							10									
10	28.77	28.39	48.8	44.5	48.8	30.7	42.1	43.7	44.9	41.3	"	4	"	3	0.006							10									
11	29.16	29.32	47.4	32.8	47.4	26.5	43.1	40.8	32.8	31.6	"	0	"	0	0.033							9									
12	29.38	29.32	45.4	32.2	45.4	26.2	42.0	42.1	42.6	40.2	"	0	"	0	0							7									
13	29.17	29.00	46.8	41.6	46.8	26.1	42.4	42.5	46.9	44.7	"	1	"	1	0							9									
14	28.85	28.49	48.0	45.5	48.0	32.5	47.5	45.4	48.8	46.7	"	0.5	"	4	0							9									
15	28.50	28.54	49.5	40.9	49.5	27.2	42.2	39.7	43.2	39.9	"	2	"	4	0.014							9									
16	28.47	28.48	46.4	40.7	46.4	26.0	44.0	43.5	44.9	39.9	"	3	"	2	0							9									
17	28.50	28.50	48.5	38.9	48.5	26.8	42.0	40.1	44.4	48.0	"	0.2	"	1.5	0.176							10									
18	28.45	28.33	57.3	39.9	57.3	34.0	51.5	47.9	40.4	38.3	"	5	"	4	0.265							10									
19	28.59	28.53	40.1	33.8	40.1	25.5	39.4	37.9	36.0	40.2	38.9	"	1.5	"	2	0.570						10									
20	28.20	28.31	41.1	33.3	41.1	26.8	40.7	39.7	35.0	34.1	"	3	"	1.5	0.210							10									
21	28.32	28.40	50.3	34.2	50.3	24.0	43.9	42.4	57.0	49.0	"	1.5	"	1	0.082							10									
22	28.34	28.66	57.5	39.5	57.5	32.0	45.9	45.3	39.9	38.6	"	4	"	1.5	0.108							9									
23	28.73	28.81	49.7	37.0	49.7	22.8	39.0	38.5	49.9	48.9	"	0	"	0.2	0.172							10									
24	28.84	28.65	50.9	46.5	50.9	34.3	48.8	46.1	47.3	45.3	"	4	"	3	0.007							10									
25	28.79	29.05	47.7	36.4	47.7	23.3	39.9	37.2	38.1	36.0	"	1.1	"	5	0.246							10									
26	29.08	29.10	40.2	34.0	40.2	23.7	37.0	35.8	34.0	33.1	"	0	"	0	0							9									
	1.06	29.10	40.1	25.0	40.1	25.0	39.0	38.1	"	0	"	0	"	0.2	0							8									
	2.05	29.01	48.0	39.5	48.0	20.0	47.1	44.3	47.8	44.9	"	0.5	"	4	0							10									
	9.13	29.19	48.0	38.8	48.0	24.7	46.3	43.9	43.8	41.8	"	1.	"	0.2	0							9									
	29.15	29.10	43.2	36.7	43.2	33.0	37.2	36.1	37.1	35.9	"	0	"	0.5	0							9									
	89164	89144	44647	11934	16448	8102	13244	12604	13491	12910		53.9		65.1	18	3933	179					29.5									
	28.762	28.756	47.2	38.5	47.2	26.1	42.6	41.3	43.5	41.6		1.73		2.10		0.126	5.8					9.5									
Index Errors.	-0.017	-0.017		7.6			-0.8	-0.8	-0.8	-0.8																					
Correction for Diurnal Range.†																															
Corrected Means.	28.745	28.739	47.2	39.1	47.2	26.1	44.8	40.5	42.7	40.8		1.73		2.10		5.8						9.5									
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.),.....= 28.745 Column No. 3 (P.M.),.....= 28.739 Barometer, Highest observed reading of Month,.....= 29.38 on the 12th

Diameter of tube _____ inch; correction for capillarity to be added,.....+ 30 Capillarity,.....= + 30 Lowest do. do.,.....= 28.03 on the 3rd

Sum,.....= 28.775 Sum,.....= 28.769 Difference, or Monthly Range,.....= 1.35

Correction for Temperature from Column No. 4 to be deducted,.....- 38 Temp. from Col. 4,.....= 38

Sum,.....= 28.737 Sum,.....= 28.731 28-734

Correction for Height above Sea-level, _____ feet, to add,.....= + 1.250 Height,.....= + 1.250 1 250

Barometer corrected and reduced to 32° and Sea-level,.....= 29.987 At 32° and Sea-level,.....= 29.981 29.981

SUMMARY OF THE WINDS.												Calm or Variable.	Mean Force.
Direction.	N	NE	E	SE	S	SW	W	NW					
A.M.	1	-	-	-	-	28	2	8	1.73				
P.M.	-	-	-	-	1	30	-	5	2.10				

Highest Reading Self-Registering Thermometer,.....= 51.5 on the 3rd of 22nd

Lowest do. do.,.....= 25.0 on the 27th

Difference, being Monthly Range,.....= 26.5

Mean of Self-Registering Thermometers,.....= 43.1

Mean Daily Range,.....= 8.7

Greatest Daily Range,.....=

Highest in Sea 79° on 11th

Lowest in Sea 9° on 27th

* 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.
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(Signed) Thos. Pearce

(Designation) _____

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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 stem 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," 1846, 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 neat-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 acted 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 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 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 "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. 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 motion of the higher strata of clouds gives no such indication. Failing 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. 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 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 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 shone 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 with a weight attached, is sunk to the required depth, 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.

Mist, Aurora Borealis, Remarkable Depression or Elevation of Barometer, Unusually Early 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. **Building, Leafing, and Flowering of Trees.**—It is necessary to bear in mind that varieties of the same species of tree often widely differ 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 Schonben's or Mofitt'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, in degrees of a circle being used to express the degree of repulsion, form a cheap and convenient electrometer. Exhaled glass or sealing-wax ascertains the nature of the electricity.

OBSERVATIONS IN CONNECTION WITH THE PERIODICAL RETURN OF THE SEASONS.

SHRUBS, ETC.	First in Blossom.	FRUITS.	First in Blossom.	Fruit Ripe generally.	MIGRATORY BIRDS.	First Arrival.	Departure.
Barberry,.....		Apple,.....			Cuckoo.....		
Bountree or Elder,.....		Black Currant,.....			House-Swallow,.....		
Broom,.....		Cherry,.....			Curlow,.....		
Hazel,.....		Gaul,.....			House-Martin,.....		
Hawthorn,.....		Gooseberry,.....			Starling,.....		
Holly,.....		Peach,.....			Swan,.....		
Laburnum,.....		Pear,.....			Rail,.....		
Lilac,.....		Plum,.....			Other Birds, naming them.		
Mezerion,.....		Strawberry,.....					
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 Epidemic disease prevails among Cattle; and the Agricultural condition of the district generally.

METEOROLOGICAL RETURNS.

FOREST TREES.	Flower.	Leaf buds first appear.	In Leaf.	Directed of Leaves.	CROPS, mentioning variety.	Sowing or Planting.	Appearing above Ground.	In Ear or Flower.	First Cut or Raised.
Allder,.....					Barley,.....				
Ash,.....					Beer or Big,.....				
Beech,.....					Oats,.....				
Birch,.....					Wheat,.....				
Elm,.....									
Larch,.....									
Line,.....									
Oak,.....									
Sycamore or Plane,.....									
					Rye Grass,.....				
					Turnips,.....				
					Peas,.....				
					Beans,.....				
					Wheat,.....				

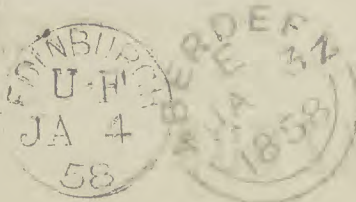
Sec., Meteorological Society,

DR STARK,

To

21, Rutland Street,

EDINBURGH.



DECEMBER 1857