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SCOTTISH METEOROLOGICAL SOCIETY.

Observations taken at Braemar, County of Shroven, in Lat. 57° 4', Long. 3° 26' W, Height above Sea 1110 feet.
Distance from Sea 57 miles. During the MONTH of February 1858.

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.	Days of Month.		
		9 ^h . A.M.		9 ^h . P.M.		PROTECTED.		EXPOSED.		9 ^h . A.M.		9 ^h . P.M.		9 ^h . A.M.		9 ^h . P.M.		Days on which it fell.	Amount.			h. A.M.										
		Barometer.	Attached Thermometer	Barometer.	Attached Thermometer	Highest in Air.	Lowest in Air.	Max. Black bulb in Sun.	Min. Black bulb during Night.	Dry bulb.	Wet bulb.	Dry bulb.	Wet bulb.	Direction.	Force.	Direction.	Force.					3 inches.	12 inches.	22 inches.								
		inches.	"	inches.	"	"	"	"	"	"	"	"	"	"	"	"	"					"	"	"							"	"
	1	28.54		28.54		28.1	18.0	48.5	18.0	18.0	17.2	18.2	16.9	N	5	W	3		0.150											1		
	2	28.48		28.45		23.0	9.7	27.8	7.5	13.1	12.5	9.7	9.5	W	0	W	0		0						10						2	
	3	28.16		27.78		45.4	9.0	45.4	6.5	29.5	28.7	44.3	43.0	SW	3	SW	6		0						10						3	
	4	27.82		28.12		44.3	35.0	44.3	32.5	36.8	34.9	36.8	35.2	"	2	SW	1		0						8						4	
	5	28.29		28.39		45.2	36.4	45.2	34.6	40.0	38.4	44.9	42.2	SW	4	SW	4		0.380						10						5	
	6	28.48		28.61		45.3	41.7	45.3	40.8	42.2	40.6	44.8	43.5	SW	4	SW	4		0.032						10						6	
	7	28.72		28.74		45.2	35.9	50.8	33.7	41.2	39.3	36.2	34.5	SW	0	SW	2		0.040						10						7	
	8	28.88		28.88		39.0	32.8	49.5	29.0	34.3	32.7	32.9	31.0	SW	0.5	SW	1		0.020						10						8	
	9	28.85		28.94		35.6	31.9	39.0	31.8	33.0	31.9	34.6	32.0	SW	1	"	1		0						9						9	
	10	29.00		29.05		35.2	33.0	39.0	31.0	33.9	33.1	33.8	33.0	SW	1.5	SW	0.5		0						10						10	
	11	28.95		28.88		37.3	31.8	41.9	28.0	34.2	32.7	31.8	31.1	SW	0.5	SW	0		0						10						11	
	12	29.01		29.08		39.7	18.2	57.0	15.2	18.2	14.0	24.0	23.0	SW	0	SW	0		0						9						12	
	13	29.04		28.95		29.8	22.8	59.0	19.2	21.6	21.6	28.8	28.8	SW	0	SW	0		0						7						13	
	14	28.93		28.90		38.0	24.0	57.0	20.0	33.8	31.8	24.0	24.0	SW	0	SW	0		0						7						14	
	15	28.80		28.75		36.6	20.4	49.8	17.0	33.8	31.8	34.0	32.8	SW	0.5	SW	0.2		0						8						15	
	16	28.76		28.85		38.9	32.6	40.7	30.0	32.1	31.0	35.2	34.0	SW	0	SW	0		0.029						10						16	
	17	28.90		28.92		43.0	20.0	60.1	16.0	20.0	19.7	25.7	25.0	SW	0	SW	0		0						9						17	
	18	28.91		28.91		43.0	17.2	53.0	13.0	17.2	16.9	27.7	26.3	"	0	"	0.2		0						9						18	
	19	28.84		28.75		37.2	14.8	53.0	11.0	14.8	14.2	30.4	29.0	"	0	SW	0.2		0						8						19	
	20	28.68		28.66		37.8	18.4	50.2	14.5	19.3	18.1	31.6	29.7	"	0	SW	0.2		0						9						20	
	21	28.68		28.68		36.3	31.0	50.1	26.5	33.8	31.8	33.2	30.7	SW	1	SW	2		0						9						21	
	22	28.76		28.82		39.2	32.6	57.2	28.0	34.8	34.9	32.6	30.0	SW	1.5	SW	0.5		0						9						22	
	23	28.84		28.78		38.8	30.8	56.8	26.5	32.4	28.5	33.0	32.1	SW	2	SW	0.2		0						9						23	
	24	28.91		29.15		36.4	33.0	57.9	31.2	34.9	34.0	33.0	31.3	SW	0.2	SW	1		0.308						10						24	
	25	29.26		29.26		38.0	33.1	54.8	19.5	30.3	28.4	23.1	23.1	SW	1	SW	0		0						10						25	
	26	29.21		29.11		38.2	37.1	55.9	18.0	24.8	22.2	30.1	28.9	SW	0	SW	0		0						10						26	
	27	29.05		28.89		36.9	30.2	58.9	26.0	32.4	30.3	36.1	34.1	SW	0.2	SW	0.5		0						9						27	
	28	28.79		28.80		36.9	30.0	52.8	27.0	33.5	32.9	30.2	29.4	"	0.2	SW	0.2		0.062						10						28	
	29																									10						29
	30																															30
	31																															31
	Sums.	805.59		805.63		1068.4	136.4	135.9	65.2	823.9	78.4	880.7	844.1	29.1		27.7	8	102.1	169.2							25.7						
	Means.	28.771		28.772		38.1	26.3	48.4	23.2	29.4	28.0	31.4	30.1	1.04		0.98		Rain 6.0								9.0						
	Index Errors.	-.011		-.011		-.1	+.1	+.2	-.1	-.1	-.1	-.1	-.1																			
	Correction for Diurnal Range.																															
	Corrected Means.	28.760		28.761		38.1	26.4	48.6	23.1	29.4	27.9	31.4	30.0	1.04		0.98		6.0								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	27				

Barometer, mean corrected reading of Column No. 1 (A.M.),.....= 28.760
Diameter of tube 0.4 inch; correction for capillarity to be added,.....+ 0.07
Sum,.....= 28.767
Correction for Temperature 30° from Column No. 2 to be deducted,.....= 0.064
Sum,.....= 28.763
Mean of the above= 28.760
Correction for Height above Sea-level, 1110 feet, to add,.....= 1.250
Barometer corrected and reduced to 32° and Sea-level,= 30.010

Column No. 3 (P.M.),.....= 28.761
Capillarity,.....= + 0.07
Sum,.....= 28.768
Temp. from Col. 1,.....= 0.10
Sum,.....= 28.758
Barometer, Highest observed reading of Month,.....= 29.26 on the 25
Lowest do. do.,.....= 27.78 on the 3
Difference, or Monthly Range,.....= 1.48

SUMMARY OF THE WINDS.										
Direction.	N	NE	E	SE	S	SW	W	NW	Calm or Variable.	Mean Force.
A.M.	2	3	2	5	4	10	2	—	11	1.04
P.M.	4	2	1	4	8	6	3	—	9	0.98

Dry bulb Thermometer (mean of Cols. 9 and 11),*.....= 30.4
Wet bulb Thermometer (mean of Cols. 10 and 12),*.....= 28.9
† Dew-point Temperature,.....= 24.5
† Elastic Force of Vapour,.....= 1.32 inch.
† Weight of Vapour in a Cubic Foot of Air,.....
† Additional Weight required to Saturate a Cubic Foot,.....
† Degree of Humidity (Saturation 100),.....= 77

Highest Reading Self-Registering Thermometer in Air and Protected,= 45.4 on the 25
Lowest do. do. do.,.....= 9.0 on the 3
Difference, being Monthly Range,.....= 36.4
Mean of Self-Registering Thermometers in Air and Protected,= 32.2
Mean Daily Range in Air and Protected,= 11.8
Greatest Daily Range, do.,= 36.4 on the 25
Highest Reading Self-Registering Black Bulb Thermometer in Sun,= 60.1 on the 17
Lowest do. do. do. from Radiation during Night,= 6.5 on the 3

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

T_G

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EDINBURGH.

METEOROLOGICAL RETURNS.

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

SHRUBS, &C.	First in Blossom.	FRUITS.	First in Blossom.	Fruit in generally.	FRUIT RISE	MIGRATORY BIRDS.	First Arrival.	Departure.
Barberry,		Apple,				Cuckoo,		
Boutree or Elder,		Black Currant,				Curtew,		
Broom,		Cherry,				House-Swallow,		
Hazel,		Gean,				Lapwing,		
Hawthorn,		Gooseberry,				Plover,		
Holly,		Peach,				Sand-Martin,		
Laburnum,		Pear,				Starling,		
Thac,		Plum,				Swan,		
Mezereon,		Strawberry,				Rail or Corn Crane,		
Mountain Ash or Rowan,						Other Birds, naming them—		
Red Flowering Currant,								
Rhododendron Ponticum,								
Whin,								

FOREST TREES.					
Alder,					
Asp,					
Beech,					
Birch,					
Elm,					
Larch,					
Lime,					
Oak,					
Sycamore or Plane,					
In flower.					
In leaf buds first appear.					
In leaf.					
Dressed or leaves.					
CROPS.					
Barley,					
Bere or Bigg,					
Oats,					
Wheat,					
Beans,					
Fasee,					
Potatoes,					
Turnips,					
Rye Grass,					
Sowing or planting.					
Growing above ground.					
In ear or flower.					
Ripe cut or raised.					

OBSERVATIONS IN CONNECTION WITH THE PERIODICAL RETURN OF THE SEASONS.

INSTRUCTIONS FOR MAKING METEOROLOGICAL OBSERVATIONS

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

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

Decorations—Brothers of Messrs. Aude and Sol'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 strong cap. 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 instruments are useless till repaired.

The Barometer should be hung in a good line, and it ought to be 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 compiled 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 *Schedulae res veridicae*, 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 ground 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-stall 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 suited commensurably with those of another.

The *Self-Indication Theorem*s should be placed exactly horizontally. In the case of the ordinary maximum *Theorem*, elevated by clay, glass or steel index, the bulb may be very *slightly* inclined, in order that the neutral column may be somewhat elevated; by the force of gravity in pushing forward the *Flot or Sink* column, and in the case of the *minimum Theorem*, the bulb should be slightly depressed, to prevent it draining of the spirit to the top of the bulb, and also that any part rising in vapour may return to the column. These *Theorem*s, if read once a-day, should be *repeated* by the reader, so that the temperatures marked by the float indicate the minimum and maximum of the day on which the reading is taken. N.B.—The readings of these instruments are taken from 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 leaf-science thermometer, for ascertaining the lowest temperature during the night from radiation, should have the minimum 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.

Hippomane. The wet bulb equivates the muslin covering it, if the weather is dry, and the muslin gets foul; in the country where the muslin is used, the muslin is changed, whenever the muslin seems to be foul. The bulb should be covered with thin tissue or blotting paper before the muslin, and the muslin should have a hole in the middle, through which the bulb can be seen, and the bulb should be placed in a glass jar, which should be stoppered, and then in pure water, before being introduced, 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 bath, so as to form a thin film over the muslin, the evaporation from the ice going on as from the simply wetted bath.

Rain Gauge—As a "Hieners's Rain Gauge" seen to possess several advantages over other types, 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 *classe cut grass*, in a place as distant as possible from trees, houses, high walls, and irregular or broken ground, and the quantity of Rain should, if possible, be registered daily. When more than one Rain Gauge is kept, they are to be placed near each other, but at different heights above the ground, and their indications noted in the column remarks, mentioning their height above ground—the regular column in the Schedule being reserved for ground Rain Gauge alone.

False hallucinations of wind direction are capable of occurring in the same manner as false hallucinations of the direction of the current of air in the straits of the ground beneath the surface of the water. The wind is not so much influenced by the neighbourhood of hills, valleys, buildings, etc. as the current of air is. The wind is not so often in reference to known objects, or as noted by means of a mill, as the current of air is. The wind is not so often in reference to a compass as the current of air is. A mirror, on which a compass may be laid, or by means of a circular mirror, fixed over the compass of a pocket compass, will, in general, give the true direction of the current of air near the earth's surface if these clouds are near and immediately over head, but it is not so in the zenith of the observer. The motion of the clouds in the zenith of the observer is not so much influenced by the straits of the ground as the current of air is. The motion of the clouds in the zenith of the observer gives no such indication. Feeling the clouds the

general direction of the smoke of a hamlet or village, or of a tall chimney, gives a better indication of the general direction of the wind than any wind-vane. The observer should state whether he has ascertained the direction by reflection or otherwise. For notice of estimating the force of the wind, see *Directions for Reading Instruments*,² but in all cases it is better to make use of Lind's Anemometer, as proposed to Messrs. Adie and Sors, and enter the greatest force of the wind during the period of observation.

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 dispersing clouds, it would be well to note in the General Remarks any fogs bearing on this point, for a few days (or nights, as the case may be) before and after every full moon; and the same observations ought to be made at the periods of new moon.

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

temperatures 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 crops, and for the germination of the seed, that the soil itself should have a certain temperature. To collect facts which may illustrate this, it is recommended to have Thermometers sunk 3, 12, and 22 inches below the surface of the ground, to ascertain the temperature of what may be termed the agricultural soil; and the temperature should enter in the Schedule the *kind* of soil; whether drained or undrained; and whether naturally wet or dry.

[illegible]

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

Budding, seeding, 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* in each kind should therefore be chosen (if possible early kinds), and their indications should be noted—always the same month from year to year being adopted.

Grass—Location whether Scholomb's or Mott's, scale and papers are used. Scholomb's are preferred. They may be had of Messrs. Ayle and Son's, 30, Princess Street, and at Mr. Elworthy's, 60, Princess Street, Edinburgh.

Electricity—Thin balls suspended by a thin thread, in connection with a metallic conductor, and under cover, give the degrees of a cable being used to express the degree of repulsion, from a charge and convenient Electrometer. Exposed glass or sealing-wax obscures the name of the electricity.

SCOTTISH METEOROLOGICAL SOCIETY.

Observations taken at Brecon, County of Shropshire, in Lat. 51° 4', Long. 3° 24', Height above Sea 1110 feet.
Distance from Sea 57 miles. During the MONTH of March 1858.

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.	Days of Month.
		9 h. A.M.		9 h. P.M.		PROTECTED.		EXPOSED.		9 h. A.M.		9 h. P.M.		9 h. A.M.		9 h. P.M.				h. A.M.								
		Barometer.	Attached Thermometer.	Barometer.	Attached Thermometer.	Highest in Air.	Lowest in Air.	Max. Black bulb in Sun.	Min. Black bulb during Night.	Dry bulb.	Wet bulb.	Dry bulb.	Wet bulb.	Direction.	Force.	Direction.	Force.			3 inches.	12 inches.	22 inches.						
		inches.		inches.																								
	1	28.86		28.91		31.0	24.3	31.0	23.3	28.2	24.7	27.4	23.4	N.E.	1	N.E.	1	0.36						10		1		
	2	28.95		28.95		31.6	24.5	33.0	26.0	26.0	25.2	23.1	29.3	N.E.	1		0.5	0.13						10		2		
	3	28.93		28.90		35.8	31.1	42.0	29.0	34.9	33.1	32.7	31.8	N.E.	2	N.W.	0	0						10		3		
	4	28.50		28.53		34.5	27.1	36.2	25.0	31.0	29.5	37.1	26.1	N.W.	2	N.W.	4	0						8		4		
	5	28.54		27.85		38.5	26.8	40.5	23.0	29.2	28.0	38.6	36.0	N.W.	1	N.W.	2	0.50						9	Partial Breezes	5		
	6	27.79		27.78		38.8	22.3	40.2	22.5	33.1	31.9	32.5	32.0	N.W.	6	N.W.	6	0						10		6		
	7	27.83		27.94		35.3	21.0	35.0	21.0	33.7	32.2	31.0	19.6	N.W.	5	N.W.	3	0.11						8		7		
	8	27.88		28.05		35.5	18.9	31.2	20.0	20.0	19.5	34.0	23.0	N.W.	3	N.W.	3	0.10						8		8		
	9	28.06		28.30		31.5	24.0	43.0	23.0	28.2	28.0	28.6	28.1	N.W.	3	N.W.	3	0.05						9		9		
	10	28.51		28.59		30.8	22.9	43.0	22.0	24.8	22.8	20.9	20.0	N.W.	2	N.W.	0.5	0.40						10		10		
	11	28.69		28.83		33.2	13.1	43.0	13.1	21.3	20.1	27.0	25.1	N.W.	0.5	N.W.	2	0.58						9		11		
	12	28.72		28.84		38.0	26.2	40.2	24.5	32.4	27.4	37.1	34.5	N.W.	0.2	N.W.	0.5	0						8		12		
	13	27.80		27.98		41.2	34.0	53.0	31.8	36.9	36.3	36.0	33.6	N.W.	0	N.W.	1	0.34						8	Partial B.	13		
	14	28.14		28.24		41.2	34.2	56.8	34.2	37.5	34.7	36.1	33.9	N.W.	1	N.W.	1	0.18						8	do	14		
	15	28.44		28.48		44.0	35.1	57.8	31.7	36.7	34.0	43.8	41.0	N.W.	2	N.W.	3	0.17						8	do	15		
	16	28.50		28.65		44.0	36.2	55.0	30.9	40.8	37.1	36.2	33.6	N.W.	2	N.W.	1.5	0						9		16		
	17	28.82		28.81		43.2	35.9	54.5	32.0	38.8	35.8	39.4	38.7	N.W.	0.5	N.W.	0.2	0						9		17		
	18	28.74		28.86		50.8	40.0	65.4	36.1	45.4	43.0	44.0	41.9	N.W.	1.5	N.W.	0.2	0						10		18		
	19	29.00		29.04		47.1	38.9	52.5	34.5	41.6	40.9	43.9	41.4	N.W.	0	N.W.	0.2	0						9		19		
	20	29.03		29.18		48.0	42.0	60.9	35.3	43.1	42.0	42.0	40.9	N.W.	1	N.W.	0.2	0						9		20		
	21	29.23		29.30		58.0	29.9	70.0	28.5	40.1	38.0	47.8	44.3	N.W.	0	N.W.	0.2	0						8		21		
	22	29.31		29.33		62.2	37.6	75.8	36.4	47.0	43.0	42.0	39.9	N.W.	0	N.W.	0.2	0						7		22		
	23	29.25		29.06		57.0	31.0	67.7	28.2	48.2	44.7	46.5	43.1	N.W.	0.5	N.W.	1.0	0						8		23		
	24	28.91		28.94		46.9	37.2	57.0	35.0	43.9	41.7	37.2	35.6	N.W.	1	N.W.	1.0	0						9		24		
	25	29.06		29.04		39.9	29.0	60.8	26.0	32.6	30.5	37.0	27.8	N.W.	0.5	N.W.	0	0.02						9		25		
	26	28.91		28.86		46.0	21.5	62.5	21.0	38.5	32.0	36.4	34.5	N.W.	0.5	N.W.	0.5	0						9		26		
	27	28.90		28.88		48.8	33.5	66.0	31.0	40.8	39.7	37.7	36.6	N.W.	1.2	N.W.	0.2	0						9		27		
	28	28.75		28.57		48.5	33.8	53.3	31.5	44.9	42.8	47.0	44.1	N.W.	0.5	N.W.	2	0.06						9		28		
	29	28.52		28.40		51.0	44.7	64.4	43.8	45.8	42.9	45.7	42.0	N.W.	3	N.W.	3	0						8		29		
	30	28.20		28.14		51.2	37.9	58.8	37.5	46.2	43.8	37.9	37.5	N.W.	1.5	N.W.	0.5	0						9		30		
	31	28.05		28.14		39.0	30.0	39.0	30.0	30.5	30.5	30.2	30.0	N.E.	1.5	N.E.	1	0.35						10		31		
	Sums.	886.82		886.89		1301.7	946.6	1574.5	878.8	1099.1	1033.1	1093.1	1029.6	429	424	14	2.165	213.7						274				
	Means.	28.607		28.609		41.9	30.5	50.4	28.3	35.4	33.1	35.2	33.5	1.41	1.36	Quin	6.8						8.8					
	Index Errors.	-.011		-.011		+.1	+.2	-.1	+.2	-.1	+.2	-.1	+.2															
	Correction for Diurnal Range.																											
	Corrected Means.	28.596		28.598		41.9	30.6	51.6	28.2	35.4	33.0	35.2	33.6	1.41	1.36		6.8						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	27

Barometer, mean corrected reading of Column No. 1 (A.M.),.....= 28.596 Column No. 3 (P.M.),.....= 28.598
Diameter of tube 0.4 inch; correction for capillarity to be added,.....+ 0.07 Capillarity,.....= + 0.07
Sum,..... 28.603 Sum,..... 28.591
Correction for Temperature from Column No. 3 to be deducted,.....- 0.014 Temp. from Col. 3.....= 14
Sum,..... 28.589 Sum,..... 28.577
Mean of the above 28.583
Correction for Height above Sea-level, 1110 feet, to add,..... 1.250
Barometer corrected and reduced to 32° and Sea-level, 29.833

Barometer, Highest observed reading of Month,.....= 29.33 on the 22nd
Lowest do. do.,.....= 27.78 on the 6th
Difference, or Monthly Range,= 1.55

SUMMARY OF THE WINDS.												Mean Force.
Direction.	N	NE	E	SE	S	SW	W	NW	Calm or Variable.			
A.M.	2	4	-	-	-	15	4	6	4			1.41
P.M.	4	4	1	1	1	8	8	4	7			1.36

Dry bulb Thermometer (mean of Cols. 9 and 11),*..... 35.3
Wet bulb Thermometer (mean of Cols. 10 and 12),*..... 33.2
† Dew-point Temperature,..... 29.9
† Elastic Force of Vapour,..... .766 inch
† Weight of Vapour in a Cubic Foot of Air,.....
† Additional Weight required to Saturate a Cubic Foot,.....
† Degree of Humidity (Saturation 100),..... 80

Highest Reading Self-Registering Thermometer in Air and Protected, 62.2 on the 22nd
Lowest do. do. do., 13.1 on the 11th
Difference, being Monthly Range,..... 49.1
Mean of Self-Registering Thermometers in Air and Protected, 36.2
Mean Daily Range in Air and Protected, 11.3
Greatest Daily Range, do.,
Highest Reading Self-Registering Black Bulb Thermometer in Sun, 75.8 on the 22nd
Lowest do. do. do. from Radiation during Night, 13.1 on the 11th

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

[illegible]

OBSERVATIONS IN CONNECTION WITH THE PERIODICAL RETURN OF THE SEASONS.

INSTRUCTIONS FOR MAKING METEOROLOGICAL OBSERVATIONS.

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

Hours 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 adhere to the Scottish Standard.

Barometer.—Barometers of Messrs Adie and Son's construction are recommended; but any instruments may be used which have adjustable surfaces, and have been compressed. 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, 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 *five 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. Wherever 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 readings*, 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 black-enamel 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 moisten covering, it to be often changed. It turns once a month, or oftener, if the weather is dry, and the moisten gets foul; in the country where 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 fresh from the start, 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, else it will conduct the moisture it may be thoroughly wetted, before it will conduct the moisture imperfectly, and yield false results. In frosty weather, water

must be covered over the web-bell, so as to form a thin film of ice on the inside, the evaporation from the ice going on as from the simple wetted ball.

Rain Gauge.—As a "Measuring" 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 out grass*, in a place as distant as possible from trees, houses, high walls, and irregular or broken ground, and the quantity of Rain should, if possible, be registered daily. When more than one Rain Gauge is kept, they ought to be placed near each other, but at different heights above the ground, and their indications noted in the *general remarks*, mentioning their height above ground—the regular column in the Schedule being reserved for the ground Rain Gauge alone.

Winds.—Isolated Wind-runes or Weather-cocks except 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 current meter fixed over the centre of a pocket compass, will, in general, give the true direction of the current of air near the earth's surface if these clouds are near and immediately over head, that is, in or near the zenith of the observer. The motion of the higher strata of clouds gives no such indication. Feeling the clouds, the general direction of the smoke of a humble or wigwag, 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 force of the wind, say *Directions for Reading Instruments*;* but in all cases it is better to make use of Lind's Anemometer, as proposed at Messrs Adie and Sol's, and enter the greatest force of the wind during the period of observation.

Clouds.—The Society recommends deserveth 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 over the whole visible sky covered with cloud is 10. Clouds often cover three-fourths or even more of the visible sky without obscuring 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 Remarks any facts bearing on this point, for a few days (or nights, as the case may be) before and after every full moon; and the same observations ought to be made at the periods of new moon.

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

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

Temperature of the Sea.—As the meteorology of the island is incomplete without a knowledge of the mean temperature of the Ocean which surrounds it, the Society strongly recommends taking the temperature of the Sea at a depth of 6 feet or 1 fathom from the end of all piers or rocks round the coast, where free from the influence of river water, and as near as may be about the time of high water. A Thermometer with its bulb fixed in a small tin pulley, covered with a stopping tin and with a weight attached, sunk to the required depth, and in ten minutes drawn up and read.

Convenient Instruments are furnished by Messrs Adie and Son.

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

Metéors. *Aurora Borealis.* *Remarkable Depression or Elevation of Barometery.* *Remarkable Falls of Rain, Hail or Snow.* *Thunder and Lightning.* &c., 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 Sprouts 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.

Grasses.—Mention whether Scotch or's or Moffat's scots and papers are used. Scotch ones are preferred. They may be had at Messrs Adie and Son's, 30, Princess Street, and at Mr. Bryson's, 60, Palace Street, Edinburgh.

Electricity.—Pith balls suspended by a linen thread, in connection with a metallic conductor, and under cover, and the degrees of a crack 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.

DR. STARK,

Sec., Meteorological Society,

21, Rutland Street,

EDINBURGH.

METEOROLOGICAL RETURNS.

SCOTTISH METEOROLOGICAL SOCIETY.

Observations taken at Barnard, County of Aberdeen, in Lat. 57° 11', Long. 3° 25' W, Height above Sea 1110 feet.

Distance from Sea 57 miles. During the MONTH of April 1858.

Days of Week.	Days of Month.	BAROMETER.		SELF-REGISTERING THERMOMETERS.				HYGROMETER.				WIND.				RAIN.	CLOUD.	SUNSHINE.	THERMOMETERS. under Ground.			TEMPERATURE OF SPRING & 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.	Days of Month.		
		9 ^h A.M.		9 ^h P.M.		PROTECTED.		EXPOSED.		9 ^h A.M.		9 ^h P.M.		9 ^h A.M.					9 ^h P.M.		h. A.M.							
		Barometer.	Attached Thermometer.	Barometer.	Attached Thermometer.	Highest in Air.	Lowest in Air.	Max. Black bulb in Sun.	Min. Black bulb during Night.	Dry bulb.	Wet bulb.	Dry bulb.	Wet bulb.	Direction.	Force.				Direction.	Force.	3 inches.						12 inches.	22 inches.
		inches.		inches.																								
	1	28.43		28.40		34.0	23.2	49.3	23.2	25.0	23.2	32.3	31.8	N.W.	2	S.W.	2	0.015	cu					10		1		
	2	28.50		28.39		34.1	25.0	50.1	20.9	29.2	25.2	26.3	24.5	W	0.5	N.E.	0.2	0.005	cu					8		2		
	3	28.29		28.47		32.9	25.8	39.3	25.0	29.1	28.5	29.0	27.7	N.E.	1.5	N.E.	0.2	0.095	cu					9		3		
	4	28.83		29.01		40.0	21.7	53.8	16.2	33.8	30.9	32.9	30.5	N.E.	0.2	N.E.	0.2	0.068	cu					9		4		
	5	28.97		28.85		39.3	26.9	53.0	22.8	34.0	31.0	33.3	31.1	S.E.	0.5	S.E.	3	0	cu					7		5		
	6	28.84		28.82		37.2	31.0	47.8	30.0	33.2	31.5	32.2	30.0	E	2	S.E.	1	0	cu					8		6		
	7	28.70		28.63		36.0	30.3	41.0	28.6	33.0	31.3	33.0	31.8	E	1	S.E.	1.5	0	cu					9		7		
	8	28.66		28.78		38.0	30.0	54.0	29.9	33.2	30.1	31.2	28.6	E	0	E	1.5	0	cu					9		8		
	9	28.84		28.82		43.5	30.5	60.8	27.0	35.2	31.5	29.0	27.8	E	0.5	S.E.	0.2	0	cu					8		9		
	10	28.78		28.76		49.3	19.0	69.7	19.0	31.6	27.5	39.0	36.5	W	0	W	1	0	cu					8		10		
	11	28.74		28.79		39.5	26.0	50.8	25.8	29.8	27.0	36.0	23.8	N.E.	2	N	1	0	cu					8		11		
	12	28.69		28.65		34.0	28.5	52.0	25.5	28.9	25.6	29.0	26.0	N.W.	1.5	N.W.	1	0.010	cu					9		12		
	13	28.72		28.77		44.0	27.0	65.4	25.2	30.9	27.6	32.7	29.3	N.W.	0.2	S.W.	0.5	0	cu					9		13		
	14	28.74		28.66		42.9	25.8	47.8	23.6	31.0	26.8	42.5	40.5	S.W.	1.5	S.W.	1	0	cu					8		14		
	15	28.65		28.69		50.0	42.3	50.0	40.9	37.5	46.0	44.3	43.7	S.W.	4	S.W.	2	0.365	cu					10		15		
	16	28.60		28.79		51.8	38.5	67.2	34.6	44.2	39.9	39.9	37.0	S.W.	1	S.W.	0.2	0.450	cu					9		16		
	17	28.76		28.82		50.0	28.0	56.2	26.5	40.7	37.2	46.3	43.2	N.W.	0.2	S.W.	2	0	cu					8		17		
	18	28.86		28.92		56.7	44.8	70.0	40.7	50.0	44.9	44.8	42.0	S.W.	2	S.W.	0.5	0	cu					8		18		
	19	28.89		28.84		56.8	34.0	75.9	30.8	48.1	45.6	44.2	41.0	S.W.	0	S.W.	0.2	0	cu					8		19		
	20	28.80		28.90		53.4	32.9	68.5	28.9	49.9	46.6	46.6	43.9	S.W.	1	S	1	0	cu					8		20		
	21	28.98		29.10		57.0	45.8	77.0	39.7	53.6	48.2	52.0	49.8	W	0.2	S.W.	0.5	0	cu					8		21		
	22	29.20		29.19		66.7	48.1	81.8	44.9	54.6	49.7	54.7	57.9	S.W.	0.5	S.W.	0.5	0	cu					8		22		
	23	29.12		29.01		71.0	37.0	99.2	33.0	54.9	50.2	54.5	53.6	S.W.	0	S	0	0	cu					7		23		
	24	28.81		28.71		63.8	35.9	82.0	33.0	53.9	52.7	45.3	42.3	E	0.5	E	0	0	cu					8		24		
	25	28.91		28.90		63.8	42.0	80.5	44.0	46.8	44.0	50.1	48.0	N.E.	0	S.E.	0.2	0	cu					9		25		
	26	28.89		28.89		59.2	33.8	77.0	29.5	52.9	48.7	45.4	44.1	E	0	E	0	0	cu					8		26		
	27	28.92		28.90		59.8	39.3	81.1	34.1	50.7	46.8	51.7	49.1	S	0	E	0	0	cu					8		27		
	28	28.82		28.66		62.4	38.8	87.4	37.0	52.8	49.4	47.2	45.3	S.E.	0.2	E	0.2	0	cu					7		28		
	29	28.30		27.89		48.5	40.2	51.0	38.5	45.2	42.2	40.8	39.6	S.W.	0.2	S.E.	0.5	0	cu					9		29		
	30	27.71		27.72		44.9	34.3	49.0	34.3	44.3	39.5	34.3	31.9	S.W.	0.2	S.W.	0.2	0.305	cu					10		30		
	31																										31	
Sums.		861.75		861.53		44625	9834	18808	9100	12395	11387	11908	11263	26.2		22.3	8	1.304	153.2					253				
Means.		28.725		28.717		48.7	32.7	62.6	30.3	41.3	37.9	39.6	37.5	0.87		0.74		5.2					8.4					
Index Errors.		-0.11		-0.11		+1							-1															
Correction for Diurnal Range.																												
Corrected Means.		28.703		28.706		48.7	32.8	62.8	30.2	41.3	37.8	39.6	37.4	0.87		0.74		1.304	5.2				8.4					
No. of Column.		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27

Barometer, mean corrected reading of Column No. 1 (A.M.).....= 28.713 Column No. 3 (P.M.).....= 28.706
Diameter of tube 0.4 inch; correction for capillarity to be added,.....+ 0.07 Capillarity,.....= + 0.07
Sum,..... 28.720 Sum,..... 28.713
Correction for Temperature from Column No. 3 to be deducted,.....- 0.32 Temp. from Col. 3.....= 29
Sum,..... 28.688 Sum,..... 28.684
Mean of the above 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

Barometer, Highest observed reading of Month,.....= 29.20 on the 22nd
Lowest do. do.= 27.71 on the 23rd
Difference, or Monthly Range,= 1.49

SUMMARY OF THE WINDS.										
Direction.	N	NE	E	SE	S	SW	W	NW	Calm or Variable.	Mean Force.
A.M.	4	6	1	2	10	4	3	6	7	0.87
P.M.	1	2	6	4	4	11	1	1	4	0.74

Dry bulb Thermometer (mean of Cols. 9 and 11),*..... 40.4
Wet bulb Thermometer (mean of Cols. 10 and 12),*..... 37.6
† Dew-point Temperature,..... 34.0
† Elastic Force of Vapour,..... 1.96 inch
† Weight of Vapour in a Cubic Foot of Air,.....
† Additional Weight required to Saturate a Cubic Foot,.....
† Degree of Humidity (Saturation 100),..... 78

Highest Reading Self-Registering Thermometer in Air and Protected, 71 on the 23rd
Lowest do. do. do. 19 on the 10th
Difference, being Monthly Range,..... 52
Mean of Self-Registering Thermometers in Air and Protected, 40.7
Mean Daily Range in Air and Protected, 15.9
Greatest Daily Range, do., 40.2
Highest Reading Self-Registering Black Bulb Thermometer in Sun, 90.2 on the 23rd
Lowest do. do. do. from Radiation during Night, 16.2 on the 4th

* 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) James Cameron M.A.
(Designation) Thomas Petco

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 perpendicularly, as ascertained by the plumb line; and it ought always to be gently tapped before taking the reading, to prevent adhesion of the mercury to the tube. In reading, the 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 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 foot or index; and in the case of the minimum Thermometer, the bulb must be slightly depressed, to prevent a dripping of the spirit to the top of the tube, and also that any part raised in vapour may return to the column. These Thermometers, so that the temperatures marked by the floats indicate the minimum and the maximum of the day on which the reading is taken. N.B.—The readings of these instruments are taken from that extremity of the float which is nearest the *lead of the column of mercury* or of spirit.

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

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

Hygrometer. The wet bulb requires the same 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 to Fanning'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 *clever cut grass*, in a place as distant as possible from trees, houses, high walls, and irregular or broken ground, and the quantity of Rain Gauge is kept, they ought to be placed near each other, but at different heights above the ground, and their indications noted in the regular 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 current mirror fixed over the centre of a pocket compass, will, in general, give the true direction of the current of air near the earth's surface if these clouds are near and immediately overhead, that is, in or near the zenith of the observer. The notion of the 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 start whether he has ascertained the direction by reflection or otherwise. For mode of estimating the force of the wind, see "Directions for Reading Instruments," but in all cases it is better to make use of Linds's Anemometer, as procured at Messrs. Adie and Son's, and enter the greatest force of the wind during the period of observation.

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 dispersing clouds, it would be well to note in the General Remarks any facts bearing on this point, for a few days (or nights, as the case may be) before and after every full moon; and the same observations ought to be made at the periods of new moon.

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

Temperature of the Sea.—As the meteorology of the island is incomplete without a knowledge of the mean temperature of the Ocean which surrounds it, the Society strongly recommends taking the temperature of the Sea at a depth of 6 feet or 1 fathom from the end of all piers or rocks, from the coast, where free from the influence of river waters, and as near as may be about the time of high water. A Thermometer with its bulb fixed in a small tin 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 instruments are furnished by Messrs. Adie and Son.

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

Building, Leaking, 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.—Attention whether Schönbach's or Müllner's scale and papers are used. Schönbach's are preferred. They may be had at Messrs. Adie and Son's, 30, Princes Street, Edinburgh.

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

OBSERVATIONS IN CONNECTION WITH THE PERIODICAL RETURN OF THE SEASONS.

FOREST TREES.	IN	LEAF.	DIVESTED OF LEAVES.	CROPS.	PLANTING OR SOWING OF ABOVE GROUND.	IN HAR.	FIRST CUT.
Alder,	April 15			Barley,			
Beech,				Bere or Bieg,	April 27		
Birch,				Oats,	April 23		
Elm,				Wheat,			
Larch,				Peas,			
Linne,				Potatoes,			
Oak,				Rye Grass,			
Sycamore or Plane,							

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

SHRUBS, ETC.	FIRST IN BLOSSOM.	FRUITS.	FIRST IN BLOSSOM.	FIRST IN FRUIT.	DEPARTURE.
Barberry,		Apple,		Cuckoo,	
Boutree or Elder,		Black Currant,		Curlew,	
Broom,		Cherry,		House-Swallow,	
Hazel,		Gean,		Lapwing,	
Hawthorn,		Gooseberry,	April 26	Plover,	
Holly,		Pear,		Sand-Martin,	
Laburnum,		Plum,		Starling,	
Lilac,		Strawberry,		Swan,	
Mezerion,				Rail or Corn Crake,	
Mountain Ash or Rowan,				Other Birds, naming them—	
Red Flowering Currant,					
Rhododendron Ponticum,					
Viburn,					

EDINBURGH.

21, Rutland Street,

Sec., Meteorological Society,

DR STARK,

METEOROLOGICAL RETURNS.

To

April 1858

EDINBURGH
APRIL 27
1858

EDINBURGH
APRIL 27
1858

EDINBURGH
APRIL 27
1858

EDINBURGH
APRIL 27
1858

Dr Stark
Rutland Street
Edinburgh

SCOTTISH METEOROLOGICAL SOCIETY.

Observations taken at Maunab, County of Shetland, in Lat. 57° 4', Long. 3° 24', Height above Sea 1110 feet.

Distance from Sea 17 miles.

During the MONTH of May 1858.

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.	Days of Month.																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																			
		9 h. A.M.		9 h. P.M.		PROTECTED.		EXPOSED.		9 h. A.M.		9 h. P.M.		9 h. A.M.		9 h. P.M.				Amount.	3 inches.	19 inches.							22 inches.																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																		
		Barometer.	Attached Thermometer.	Barometer.	Attached Thermometer.	Highest in Air.	Lowest in Air.	Max. Black bulb in Sun.	Min. Black bulb during Night.	Dry bulb.	Wet bulb.	Dry bulb.	Wet bulb.	Direction.	Force.	Direction.	Force.													Days on which it fell.																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																	
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Barometer, mean corrected reading of Column No. 1 (A.M.)..... = 28.625 Column No. 3 (P.M.)..... = 28.626
 Diameter of tube 0.4 inch; correction for capillarity to be added..... + 0.07 Capillarity..... = + 0.07
 Sum..... 28.632 Sum..... 28.633
 Correction for Temperature from Column No. 1 to be deducted..... = 0.07 Temp. from Col. 3..... = 0.40
 Sum..... 28.585 Sum..... 28.593

Mean of the above..... 28.589
 Correction for Height above Sea-level, 1110 feet, to add..... 1.250
 Barometer corrected and reduced to 32° and Sea-level, 29.839

Dry bulb Thermometer (mean of Cols. 9 and 11),*..... 45.4
 Wet bulb Thermometer (mean of Cols. 10 and 12),*..... 41.8
 † Dew-point Temperature..... 37.6
 † Elastic Force of Vapour..... 2.23 in.
 † Weight of Vapour in a Cubic Foot of Air.....
 † Additional Weight required to Saturate a Cubic Foot.....
 † Degree of Humidity (Saturation 100)..... 75

* 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.

Highest Reading Self-Registering Thermometer in Air and Protected, 68° on the 31st
 Lowest do. do. do. do. 25.8 on the 4th
 Difference, being Monthly Range,..... 42.2
 Mean of Self-Registering Thermometers in Air and Protected, 46.7
 Mean Daily Range in Air and Protected, 15.1
 Greatest Daily Range, do.,
 Highest Reading Self-Registering Black Bulb Thermometer in Sun, 85.1 on the 31st
 Lowest do. do. do. from Radiation during Night, 25.8 on the 4th

(Signed) James Cameron M.D.

(Designation) The Secy

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.

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

SHRUBS, ETC.		FRUITS.		ALLEGATORY BIRDS.	
First in Blossom.	First in Fruit.	First in Blossom.	First in Fruit.	First Arrival.	Departure.
Barberry,		Apple,		Cuckoo,	
Boutree or Elder,		Black Currant,	<i>May 15</i>	Curlew,	
Broom,	" 75	Cherry,	<i>May 15</i>	House-Sparrow,	<i>May 10</i>
Hazel,		Gean,	<i>May 15</i>	Lapwing,	
Hawthorn,		Gooseberry,		Plover,	
Holly,		Peach,		Sand-Martin,	
Laburnum,		Pear,		Starling,	
Lilac,		Plum,		Swan,	
Alexander,		Strawberry,		Rail or Corn Crane,	<i>Maybe 13</i>
Mountain Ash or Rowan,				Other Birds, naming them—	
Red Flowering Currant,					
Rhododendron Ponticum,					
Vibin,					

[illegible]

OBSERVATIONS IN CONNECTION WITH THE PERIODICAL RETURN OF THE SEASONS.

INSTRUCTIONS FOR MAKING METEOROLOGICAL OBSERVATIONS.

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

Hour 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.

Zoroaster—and owners of instruments who use the usual kind of instrument are recommended to buy a *Zoroaster* before this inevitable adjustable standard is put in the comparison. Before this instrument is shipped to the store, it should be examined in order to ascertain that the space above the mercury is free from air. This is done by holding the instrument somewhat from the vertical position, then, if free from air, the mercury will settle against the top of the scale, and the space above it will be empty. The instrument will then fill the tube with a sharp tap. The mercury should be completely full of the tube. If any air has got into it, it should be driven into the column by reversing the instrument, and tapping it gently with the hand. If it cannot be thus expelled, the instrument is useless till repaired.

pendicular, 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 read-

ings 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 Pnyctics 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 its near as may be *glorified* 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 near-side 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 the 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 *Shikasta* has a *tableau* of the *ascensions*. Thermometer, horizontal. In the case of the ordinary *ascensions*, Thermometer, with clay, glass, or steel index, the bulb may be very *slightly* elevated, in order that the mercury column may be so *slightly* raised by the force of gravity in pushing forward the float or index; and in the case of the *unordinary* Thermometer, the bulb must be slightly depressed, to prevent a raising of the spirit to the top of the tube, and also that any part raised in *any* way may return to the column. These Thermometers, if held over a *dry* glass, should *always* be *used* on the *ascensions*, so that the temperatures marked by the floats indicate the minimum and the maximum of the *any* on which the readings are 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 *minimum* 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.

lowest temperature during the night from tradition, should have its bulb suitably blackened and powdered dull, and be similarly mounted. It should be half 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. *Hygrometers*.—This bulb requires the muslin covering it to be changed. In towns once a month, or often if the

On other occasions, when the weather is windy, and the muslin gets foul, it is 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 waste which collects 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, when

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

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, trees, &c. When low clouds are seen drifting along, their direction in reference to known objects, or as noted by means of a mirror on which a compass may be laid, or by means of a circular mirror fixed over the centre of a pocket compass, will, in general, give the true direction of the current of air near the earth's surface if these clouds are near and immediately over head, that is, in or near the zenith of the observer. The motion of the higher parts of clouds gives no such indication. Floating clouds, the central direction of a hamlet or village, or of a tall

chimney, ⁵ gave 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. Formule for estimating the force of the wind, see "Directions for Reading Instruments," but in all cases it is better to make use of *Linds Anemometer*, as prevented at Messrs Aldie and Son's, and enter the greatest force of the wind during the period of observation. *Clouds*—The Society recommends observers to adopt the

Howard immenitence of clouds. The scale of cloud in this 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 sunbathing. As the full moon, so long as it is above the horizon, is for sunbathing.

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

Thermometers under Ground.—Though the temperature and hygrometric conditions of the air are those which chiefly influence the growth of crops it is important for the health of the crop, and for the germination of the seed, that the soil itself should have a certain temperature. To collect facts which may illustrate this, it is recommended to have *Thermometers* sunk 3, 12, and 22 inches below the surface of the ground, to ascertain the tempera-

Tanghulsa of the Sea—As the meteorology of the island is incomplete without a knowledge of the mean temperature of the Ocean which surrounds it, the Society strongly recommends taking the temperature of the Sea at a depth of 6 feet or 1 fathom from the end of all piers or rocks round the coast, where free from the influence of other waters 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 sent to the appointed depth, and in ten minutes drawn up and read. The observations are to be made at the same hour of the day. Conventional instruments are furnished by Messrs. Adie and Son.

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

Budding, Tooling, and Planing 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 on Shrub, in each kind of seedling, may be chosen (if possible early kinds), and their indications should be alone noted—always the same plant from year to year being noticed.

Orator—mention whether Schomburgk's or Moffat's scale and paper are used. Schomburgk's are preferred. They may be had in classes: Africa and South, 50; Princes Street, and at Mr. J. Rogers, 40; Pattee's Street, Edinburgh.

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

 T_G

DR STARK,

Sec., Meteorological Society,

21, Rutland Street,

EDINBURGH.

METEOROLOGICAL RETURNS.

SCOTTISH METEOROLOGICAL SOCIETY.

Observations taken at Stranraer, County of Ards, in Lat. 54° 4', Long. 5° 24' W, Height above Sea 110 feet.
Distance from Sea 57 miles. During the MONTH of June 1858.

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.	Days of Month.		
		9 ^h A.M.		9 ^h P.M.		Protected.		Exposed.		9 ^h A.M.		9 ^h P.M.		9 ^h A.M.		9 ^h P.M.				Days on which it fell.	Amount.	h. A.M.							
		Barometer.	Attached Thermometer.	Barometer.	Attached Thermometer.	Highest in Air.	Lowest in Air.	Max. Black bulb in Sun.	Min. Black bulb during Night.	Dry bulb.	Wet bulb.	Dry bulb.	Wet bulb.	Direction.	Force.	Direction.	Force.					3 inches.						12 inches.	22 inches.
		inches.		inches.													days.	inches.	1 to 10.	Hours.									
	1	28.87		28.96		67.049	4.93	64.5	58.2	57.0	55.3	52.1	S.W.	0	N.E.	0.5	0	0	0								1		
	2	28.93		28.79		64.438	4.88	63.3	58.5	52.9	52.0	50.8	E	0	E	1	0	0	0								2		
	3	28.76		28.66		63.750	3.75	60.5	60.7	55.9	54.8	54.2	S.W.	1	S.E.	0.5	0	0	0								3		
	4	28.65		28.83		59.049	8.81	65.0	53.0	64.9	52.3	49.5	S.W.	1.5	S.W.	4	0	0	0								4		
	5	28.87		28.85		58.049	2.75	64.6	54.4	64.8	50.7	44.9	S.W.	4	S.W.	1.5	0	0	0								5		
	6	28.77		28.97		59.043	2.74	63.8	53.4	64.2	49.2	46.9	W	0	S.W.	1	0	0	0								6		
	7	28.83		28.88		65.038	9.80	63.0	57.1	52.1	56.8	50.0	S.W.	0	S.W.	1.5	0	0	0								7		
	8	28.52		28.52		69.042	2.89	63.6	60.1	55.0	57.0	52.3	S.W.	0	S.W.	1	0	0	0								8		
	9	28.86		28.86		69.349	8.94	63.3	57.8	55.2	52.8	49.1	S	0	S.W.	0.5	0	0	0								9		
	10	28.91		28.99		64.948	3.91	64.3	62.3	57.0	56.8	54.6	S.W.	0	S.E.	0.2	0	0	0								10		
	11	28.99		28.91		67.052	7.96	65.1	57.9	55.0	57.6	54.3	S.E.	0.2	E	0.5	0	0	0								11		
	12	28.81		28.76		68.053	0.93	67.0	60.2	57.1	57.5	56.0	S.E.	0	S	0.2	0	0	0								12		
	13	28.75		28.73		65.056	3.95	65.0	60.9	57.3	53.8	56.2	S	0.2	S.W.	1	0	0	0								13		
	14	28.70		28.70		68.152	0.77	64.0	60.4	56.1	52.8	58.5	S.W.	0.2	S.W.	1.5	0	0	0								14		
	15	28.82		28.96		64.958	0.95	65.0	66.0	55.0	63.8	61.0	S.W.	3	S.W.	1	0	0	0								15		
	16	28.86		28.85		72.759	0.96	63.1	53.2	67.2	62.3	61.1	S	0.2	E	0	0	0	0								16		
	17	28.72		28.59		73.857	0.92	64.5	62.7	60.9	56.2	54.3	E	0.2	S.W.	1	0	0	0								17		
	18	28.86		28.70		66.147	3.89	64.2	56.6	51.2	59.9	52.2	S.W.	1	S.W.	0.5	0	0	0								18		
	19	28.89		28.94		65.143	8.94	63.6	59.5	59.8	53.5	52.0	S.W.	0.2	S.W.	0.5	0	0	0								19		
	20	29.01		29.09		65.943	2.86	65.0	55.0	54.2	56.0	54.0	S	0	S.E.	0	0	0	0								20		
	21	29.14		29.12		70.046	2.94	63.8	62.2	55.0	62.8	58.2	S.W.	0	S.W.	1	0	0	0								21		
	22	29.13		29.25		70.259	9.93	63.2	64.1	63.3	59.2	57.0	S.W.	0.5	S.W.	0.5	0	0	0								22		
	23	29.23		28.48		62.838	0.80	60.2	59.0	54.0	54.0	53.4	S	0	S.W.	0.2	0	0	0								23		
	24	29.11		29.13		67.546	4.78	64.0	65.1	66.8	50.4	46.0	S.W.	1.5	W	1	0	0	0								24		
	25	29.01		28.80		60.048	3.88	64.5	65.0	50.0	54.1	48.2	W	1	S.W.	2	0	0	0								25		
	26	28.63		28.67		63.540	3.77	64.2	63.2	64.4	64.0	60.3	S.W.	1	S.W.	1	0	0	0								26		
	27	28.76		28.87		54.042	2.81	68.2	67.9	62.8	65.7	62.3	S.W.	1.5	S.W.	1	0	0	0								27		
	28	28.67		28.69		58.244	0.81	68.0	57.5	68.2	57.0	64.1	S.W.	0.5	S.W.	2	0	0	0								28		
	29	28.70		28.80		63.646	4.98	64.5	59.4	64.3	52.0	57.0	S.W.	0.5	W	1	0	0	0								29		
	30	28.79		28.80		64.046	5.80	64.2	54.6	66.7	67.3	65.4	W	0.5	S.W.	1	0	0	0								30		
	31																										31		
	Sums.	866.25		866.08		1960.2	143.56	2600.5	1207.7	774.54	1393.2	1640.4	1550.0	18.7	28.6	1470	170.5												
	Means.	28.875		28.869		65.347	8.86	63.6	63.6	58.2	53.1	56.6	57.6	0.62	0.95	5.7													
	Index Errors.	-.017		-.017		-	+.2	+.2	-1	-	-.1	-	-.1																
	Correction for Diurnal Range.†																												
	Corrected Means.	28.858		28.852		65.348	0.86	63.5	58.2	53.0	54.6	51.5		0.62	0.95	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.),.....= 28.858 Column No. 3 (P.M.),.....= 28.852 Barometer, Highest observed reading of Month,.....= 29.25 on the 23.22
Diameter of tube inch; correction for capillarity to be added,.....+ 30 Capillarity,.....= + 30 Lowest do. do.,.....= 28.69 on the 17
Sum,..... 28.858 Sum,..... 28.852 Difference, or Monthly Range,.....= 0.66
Correction for Temperature from Column No. 3 to be deducted,.....= 0.76 Temp. from Col. 3,.....= 0.66
Sum,..... 28.812 Sum,..... 28.816
Mean of the above 28.814
Correction for Height above Sea-level, 110 feet, to add,..... 1.260
Barometer corrected and reduced to 32° and Sea-level, 30.064

SUMMARY OF THE WINDS.									
Direction.	N	NE	E	SE	S	SW	W	NW	Calm or Variable.
A.M.	-	1	3	-	9	11	5	1	0.62
P.M.	1	2	3	2	6	11	3	2	0.95

Dry bulb Thermometer (mean of Cols. 9 and 11),*..... 56.4
Wet bulb Thermometer (mean of Cols. 10 and 12),*..... 52.2
† Dew-point Temperature,..... 48.3
† Elastic Force of Vapour,..... 0.520 inch
† Weight of Vapour in a Cubic Foot of Air,.....
† Additional Weight required to Saturate a Cubic Foot,.....
† Degree of Humidity (Saturation 100),..... 74.

Highest Reading Self-Registering Thermometer in Air and Protected, 73.8 on the 17
Lowest do. do. do., 38.0 on the 23
Difference, being Monthly Range,..... 35.8
Mean of Self-Registering Thermometers in Air and Protected, 56.6
Mean Daily Range in Air and Protected, 17.3
Greatest Daily Range, do.,
Highest Reading Self-Registering Black Bulb Thermometer in Sun, 96° on the 16
Lowest do. do. from Radiation during Night, 30.2 on the 23

* 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.

(Signed) James Cameron M.D.
(Designation) The Doctor

ABERDEEN
JULY 14 1858

EDINBURGH
JULY 15 1858

EDINBURGH
JULY 15 1858

JUN 18 1858

(H)

DR STARK,

Sec., Meteorological Society,

21, Rutland Street,

EDINBURGH.

METEOROLOGICAL RETURNS.

SHRUBS, ETC.		FRUITS.		MIGRATORY BIRDS.		First Arrival.		First Departure.	
Barberry,	Apple,	Black Currant,	Cherry,	Cuckoo,	Cuckoo,	First	Arrival	First	Departure
Broom,	Black Currant,	Cherry,	Cuckoo,	Cuckoo,	Cuckoo,	First	Arrival	First	Departure
Bourne or Elder,	Black Currant,	Cherry,	Cuckoo,	Cuckoo,	Cuckoo,	First	Arrival	First	Departure
Holly,	Black Currant,	Cherry,	Cuckoo,	Cuckoo,	Cuckoo,	First	Arrival	First	Departure
Laburnum,	Black Currant,	Cherry,	Cuckoo,	Cuckoo,	Cuckoo,	First	Arrival	First	Departure
Lime,	Black Currant,	Cherry,	Cuckoo,	Cuckoo,	Cuckoo,	First	Arrival	First	Departure
Mountain Ash or Rowan,	Black Currant,	Cherry,	Cuckoo,	Cuckoo,	Cuckoo,	First	Arrival	First	Departure
Red Flowering Currant,	Black Currant,	Cherry,	Cuckoo,	Cuckoo,	Cuckoo,	First	Arrival	First	Departure
Rhododendron Ponticum,	Black Currant,	Cherry,	Cuckoo,	Cuckoo,	Cuckoo,	First	Arrival	First	Departure
Whin,	Black Currant,	Cherry,	Cuckoo,	Cuckoo,	Cuckoo,	First	Arrival	First	Departure
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.		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.		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.		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.		Have the goodness also to state any information you may be able to collect relative to the Crops of Grain, Hay, Potatoes, Turnips, Fruits, etc., whether plentiful, or in perfection; whether any have suffered from blight, disease, etc. Whether Epizootic disease prevails among Cattle; and the Agricultural condition of the district generally.	

OBSERVATIONS IN CONNECTION WITH THE PERIODICAL RETURN OF THE SEASONS.

FOREST TREES.		CROPS.		First Cut.		First Out.	
Alder,	Barley,	Barley,	Barley,	First	Out	First	Out
Aspen,	Barley,	Barley,	Barley,	First	Out	First	Out
Beech,	Barley,	Barley,	Barley,	First	Out	First	Out
Birch,	Barley,	Barley,	Barley,	First	Out	First	Out
Elm,	Barley,	Barley,	Barley,	First	Out	First	Out
Larch,	Barley,	Barley,	Barley,	First	Out	First	Out
Lime,	Barley,	Barley,	Barley,	First	Out	First	Out
Oak,	Barley,	Barley,	Barley,	First	Out	First	Out
Sycamore or Plane,	Barley,	Barley,	Barley,	First	Out	First	Out
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* Notice. The Direction & Force of the Wind have been entered in the usual columns this month's returns. The A.M. observations have been entered in the P.M. column & the P.M. observations in the A.M. column.

SCOTTISH METEOROLOGICAL SOCIETY.

Observations taken at Glasgow, County of Argyll, in Lat. 57° 4', Long. 5° 24' 9", Height above Sea 1110 feet.
Distance from Sea 57 miles. During the MONTH of July 1858.

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.	Days of Month.			
		h. A.M.		h. P.M.		PROTECTED.		EXPOSED.		h. A.M.		h. P.M.		h. A.M.					h. P.M.		h. A.M.									
		Barometer.	Attach- ed Ther- mometer	Barometer.	Attach- ed Ther- mometer	Highest in Air.	Lowest in Air.	Max. Black bulb in Sun.	Min. Black bulb during Night.	Dry bulb.	Wet bulb.	Dry bulb.	Wet bulb.	Direction.	Force.				Direction.	Force.	1 to 10.							3 inches.	12 inches.	22 inches.
		inches.		inches.																										
	1	28.81		28.83		53.3	46.8	61.6	40.8	43.2	41.2	44.8	N	4	N	3	0.040									1				
	2	28.92		29.02		60.6	45.1	74.0	42.6	47.2	44.6	46.0	N	4	N	0.5	0.039									2				
	3	29.05		29.06		61.4	45.0	82.0	40.3	48.6	44.6	51.7	N	0.5	N	0.2	0.040									3				
	4	28.80		28.50		57.5	45.9	56.2	45.3	45.7	45.3	50.5	N	0.5	N	0.2	0.400									4				
	5	28.46		28.57		56.8	46.9	81.7	44.1	51.0	47.0	47.6	N	0.5	N	0.2	0.300									5				
	6	28.57		28.66		52.0	45.2	57.9	45.0	47.0	45.8	45.3	N	0.5	N	0.0	0.275									6				
	7	28.54		28.56		54.0	43.0	59.0	44.0	47.9	46.0	46.2	N	0.2	N	0.0	0.098									7				
	8	28.65		28.76		57.0	44.5	52.0	43.5	48.7	46.1	47.1	N	0.2	N	0.0	0.341									8				
	9	28.71		28.82		52.8	45.2	55.8	43.9	47.8	46.1	50.0	N	0.0	N	0.5	0.253									9				
	10	28.92		28.99		63.8	47.2	85.9	44.0	51.1	49.4	55.2	N	0.0	N	0.0	0.000									10				
	11	28.95		28.97		62.0	46.1	83.9	43.7	53.8	51.0	59.1	N	0.2	N	0.2	0.000									11				
	12	28.86		28.96		60.4	45.3	89.2	44.0	52.9	51.7	57.3	N	0.5	N	0.2	0.000									12				
	13	28.56		28.48		63.0	49.8	99.0	44.3	56.3	51.1	51.0	N	1.0	N	0.0	0.500									13				
	14	28.42		28.76		63.5	50.9	99.0	44.2	59.0	55.3	51.2	N	1.5	N	0.5	1.120									14				
	15	28.81		28.73		63.7	47.0	93.7	47.0	49.0	47.8	51.4	N	0.2	N	0.2	0.055									15				
	16	28.75		28.83		61.0	45.6	61.0	45.0	52.0	53.6	56.0	N	0.0	N	0.0	0.020									16				
	17	28.91		28.87		62.0	45.6	71.3	45.0	57.0	56.4	56.0	N	0.2	N	0.0	0.086									17				
	18	28.81		28.85		65.2	51.0	81.0	47.0	59.4	53.8	52.3	N	1.5	N	0.0	0.000									18				
	19	28.95		28.90		62.7	48.7	77.0	46.0	55.9	52.0	51.8	N	1.0	N	0.5	0.061									19				
	20	28.74		28.63		60.2	47.8	71.0	45.0	51.2	53.0	52.0	N	0.2	N	0.0	0.000									20				
	21	28.55		28.59		56.0	46.0	61.0	46.8	53.6	52.8	49.0	N	0.0	N	0.0	0.588									21				
	22	28.56		28.60		61.0	45.0	77.0	47.8	55.9	51.0	51.8	N	1.5	N	0.0	0.111									22				
	23	28.68		28.57		60.0	46.2	76.0	46.0	52.0	49.9	49.2	N	1.0	N	1.0	0.010									23				
	24	28.53		28.36		62.7	47.5	84.4	44.2	56.0	51.8	55.0	N	1.0	N	1.0	0.023									24				
	25	28.20		28.40		58.0	49.9	77.0	47.1	55.0	52.0	50.9	N	1.0	N	0.5	0.000									25				
	26	28.53		28.64		61.0	47.3	77.0	47.1	51.9	53.2	48.0	N	1.0	N	0.5	0.000									26				
	27	28.70		28.79		62.8	46.3	83.0	43.0	52.0	48.3	50.9	N	0.0	N	0.2	0.000									27				
	28	28.55		28.74		60.1	45.3	87.9	44.0	53.2	51.1	50.8	N	0.2	N	0.0	0.000									28				
	29	28.44		28.44		62.2	45.4	91.0	42.2	52.0	48.7	52.3	N	0.0	N	0.2	0.000									29				
	30	28.43		28.75		64.7	46.2	92.0	45.5	56.0	50.6	52.0	N	0.0	N	0.0	0.000									30				
	31	29.00		29.11		63.2	48.8	86.8	45.5	54.8	49.8	50.4	N	0.5	N	0.0	0.000									31				
	Sums.	890.52		891.23		1863.14	1476.23	2242.4	146.6	1648.9	1652.1	1579.5	1527.7	22.4	106.0	20.0	4.37	22.7												
	Means.	28.726		28.734		60.2	45.7	74.9	43.4	53.1	50.0	50.9	49.2	0.71	0.34	0.65	7.3													
	Index Errors.	-.017		-.017																										
	Correction for Diurnal Range.																													
	Corrected Means.	28.709		28.732		60.2	45.9	75.1	43.3	53.1	49.9	50.9	49.1	0.71	0.34	0.65	7.3													
	No. of Column.	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27		

Barometer, mean corrected reading of Column No. 1 (A.M.).....= 28.709 Column No. 3 (P.M.).....= 28.732
Diameter of tube inch; correction for capillarity to be added.....+ 30 Capillarity.....= + 30
Sum.....= 28.734 Sum.....= 28.762
Correction for Temperature from Column No. 2 to be deducted.....= - 64 Temp. from Col. 4.....= - 33
Sum.....= 28.670 Sum.....= 28.704
Mean of the above.....= 28.689

Correction for Height above Sea-level, 1110 feet, to add.....= 1.250
Barometer corrected and reduced to 32° and Sea-level.....= 29.939

Dry bulb Thermometer (mean of Cols. 9 and 11)*.....= 57.0
Wet bulb Thermometer (mean of Cols. 10 and 12)*.....= 49.5
† Dew-point Temperature.....= 46.4
† Elastic Force of Vapour.....= .322 in.
† Weight of Vapour in a Cubic Foot of Air.....
† Additional Weight required to Saturate a Cubic Foot.....
† Degree of Humidity (Saturation 100).....= 89.

* 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.

Barometer, Highest observed reading of Month.....= 29.11 on the 31
Lowest do. do.....= 28.50 on the 25
Difference, or Monthly Range.....= .61

SUMMARY OF THE WINDS.										
Direction.	N	NE	E	SE	S	SW	W	NW	Calm or Variable.	Mean Force.
A.M.	5	4	6	10	4	2	14	0.34		
P.M.	1	6	4	4	13	1	2	8	0.71	

Highest Reading Self-Registering Thermometer in Air and Protected.....= 69.6 on the 13
Lowest do. do.....= 25.9 on the 29
Difference, being Monthly Range.....= 33.7
Mean of Self-Registering Thermometers in Air and Protected.....= 52.9
Mean Daily Range in Air and Protected.....= 14.3
Greatest Daily Range.....
Highest Reading Self-Registering Black Bulb Thermometer in Sun.....= 92.0 on the 30
Lowest do. do.....
from Radiation during Night.....= 31.2 on the 29

(Signed) James Cameron M.D.
(Designation) The Place

Epizootic disease prevails among Cattle; and the Agricultural condition of the district generally.

Turnips, Fruits, etc., whether plentiful, or in perfection; whether any have suffered from blight, etc., and the goodness also to state any information you may be able to collect relative to the Crops of Grain, Hay, Potatoes,

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

FOREST TREES.	In Flower.	In Leaf Buds.	In Leaf.	Divested of Leaves.	CROPS mentioning variety.	Sowing or Planting.	Appearing or above Ground.	In Ear.	First Cut
Alder,					Barley,				
Asch,					Bere or Begg,				
Beech,					Oats,				
Birch,					Wheat,				
Elm,					Beans,				
Larch,					Pence,				
Lime,					Potatoes,				
Oak,					Turnips,				
Sycamore or Plane,					Rye Grass,				

OBSERVATIONS IN CONNECTION WITH THE PERIODICAL RETURN OF THE SEASONS.

INSTRUCTIONS FOR MAKING METEOROLOGICAL OBSERVATIONS

Those pens 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 :

Hours of Observation.—All instruments which are observed twice a-day, should be read at the same hour morning and evening, in order to furnish men's 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, accordingly, however, to observe at the same hour, that the evening and morning readings be taken at the same hour, and this hour entered on the Schedule.

Barometers of Messrs. Aale and Sol'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 not completely fill the tube. If any air has got admittance, it should be driven into the cavity by reversing the instrument, and tapping it gently with the hand. If it cannot be thus expelled, the instrument is useless till repaired.

The Dürer letter seems to be missing in a good light; and particularly, as ascertained by the plumb line; and it ought always to be gently tapped before taking the reading to prevent dislodgement of the mercury to the tube. In readings, 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. Do not touch the thermometer, or breathe on it, or place it in the mouth. The conversion table, which is blank, is D.

and the corrections necessarily 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 given in the Report of the Committee of the Royal Society on the subject, in the *Philosophical Transactions* for 1840, p. 105. The daily readings of the barometer ought to be entered on the Schedule as read, and the corrections only applied to the mean for the month. *Self-registering Thermometers and Hygrometers*.—These should be placed outside of each other, in a place freely exposed to the air, but protected from sunshine, and from reflected heat, as far as possible, from radiation and from rain, and as near as may be four feet from the general surface of the ground. Different combinations are used for this purpose, either a double ventilated box with ivory-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 five cornered or octagonal box with ivory-boarded sides, fixed in an exposed position, and if possible over glass. Whatever means are finally adopted, the position of the instruments should be mentioned, and should not be changed (without due notice being given to the observer), in order that the results of one month's observations be strictly comparable with those of another.

The *Self-Regulating Thermometer* should be placed exactly horizontal. In the case of the ordinary *maximum* *Thermometer*, the bulb may be very slightly raised, in order that the *mercurial column* may be somewhat elevated by the force of gravity in pushing forward the float or bulb; 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 *extremities*, so that the temperatures marked on the floats indicate the minimum and the maximum of the day, which the reading is taken. N.B.—The readings of these *instruments* are taken from that extremity of the float which is

The instrument. Registering Thermometer, for ascertaining the heat of the sun's rays, with its bulb blackened by soot or surface powdered dull, and it should be mounted in a handle of wood, 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 veined dull, and be similarly mounted. It should be laid out about sunset, over grass, in a level place exposed to the sky; but raised on wooden supports a few inches above the surface, and removed during the day.

hydrophobic—the acid bath requires the muslin covering it to be changed. It turns once a month, or often, if the muslin cover is dusty, and the muslin gets foul; in the country where the muslin seems to be for sale. The bath should be changed with thin tissue or blotting paper, below the muslin, and the muslin should always be thoroughly wetted, and freed from dirt, before being used; and the cotton wick which conducts the liquid should be previously soaked in a solution of washing soda, and then be changed, if necessary, in order that it may be thoroughly wetted, else it being retained, the moisture and yield gives results.

must be joined over the wet bull, so as to form a thin film of ice on the mushin, the evaporation from the ice going on as from the simply wetted bull.

second and third stages of the program. Various oranges seem to possess different degrees of juiciness; the Society gives the preference to those that are not too juicy. The following are the instructions to them: "But oranges may not be employed, in other than all the situations may well be employed, as recommended, but the Gauche be sunk in the ground, so that the top of the receiver is nearly on a level with the top of the soil. The top of the receiver is as distant as possible from trees, houses, high walls, and vegetation, and is not to be exposed to the wind. The ground is to be irrigated daily. When more than one Bag Gauge is possible, it is to be placed near each other, but at different heights above the ground, and their indications noted in the *gauche's* records, mentioning their height above ground—the regular column in the Scheme may be reserved for the ground Bag Gauge alone in

Winds—placed Wind-ward or Wind-wards are not 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, rocks, buildings, etc. Where low clouds are seen drifting along their direction in reference to known objects, or as noted by means of a compass fixed over the centre of a pocket compass, will, in general, indicate the true direction of the current of air near the earth's surface; if these clouds are near and immediately overhead, that is, at or near the zenith of the observer. The motion of the higher clouds of clouds is not such indication. Fading the clouds the

general direction of the smoke a handle or village, or of a tall chimney, gives a better indication of the general direction of the wind than any wind-vane. The observer should state whether he has ascertained the direction by reflection or otherwise. For mode of estimating the force of the wind, see "Directions for Reading Instruments," but in all cases it is better to make use of Lind's anemometer, as procured at Messrs. Adie and Son's, and enter the greatest force of the wind during the period of observation.

Clouds.—The Society recommends observers to adopt the following 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 even more of the visible sky without obstructing clouds—four-fifths or even more of the visible sky without obstructing clouds would not necessarily express, or agree with, the column of sunshine. As the hill moon, so *long as it is above the horizon*, is thought by some eminent astronomers to have a powerful effect in dispersing clouds 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.

Swallow.—The number of loons the sun shines during the year should be entered in the proper column.

Thermometers under Ground.—Though the temperature and hygrometric conditions of the air are those which chiefly influence the growth of crops, it is important for the health of the crop, and the germination of the seed, that the soil itself should have a certain temperature. To collect facts which may illustrate this, we recommended to have Thermometers sunk 2, 12, and 22

aches below the surface of the ground, to ascertain the temperature of what may be termed the agricultural soil, and the observer may enter in the Scheclite the *kind of soil*; whether drained or undrained; and whether naturally wet or dry.

Importance of the Sea.—As the meteorology of the island is completely without a knowledge of the mean temperature of the Ocean which surrounds it, the Society strongly recommends the temperature of the Sea at a depth of 6 feet or 1 fathom in the end of all pieces of rocks round the coast, where there is the influence of new waters, and as near as may be about the mouths of high waters. A thermometer, with its bulb fixed in a small piece of light water, and with a weight attached, and suspended to the required depth, and in tannettes thrown up and read.

various instruments are illustrated by Messrs. Adams and Son, *Temperature of Springs*.—The temperature of Springs and Deep Wells is recommended to be taken wherever predictable, mentioning whether Spring or Well, and its depth from the surface. *Thermometers, Barometers, Luminometer Depression or Altitude* *Thermometers, Memorable Tides of June, End or Snow, Thunder Storms, Etc.*, should be specially noticed, together with exact hour at which they were first seen, their continuance, direction, duration, and *Placing of Trees*.—It is necessary to note the number of the same species of true olive widely distributed, and the number of the same species of true olive widely distributed, and the number of the same species of true olive widely distributed, and the number of the same species of true olive widely distributed.

Electricity.—Pith balls suspended by a mean thread, in connection with a metallic conductor, and under cover, and the degrees of electric force being used to express the degree of repulsion, form a characteristic and convenient Electrometer. Exactness of scale.—

DR STARK,

Sec., Meteorological Society.

21, Rutland Street,

EDINBURGH.

METEOROLOGICAL RETURNS.

SCOTTISH METEOROLOGICAL SOCIETY.

Observations taken at Perth, County of Perth, in Lat. 57° 11', Long. 3° 26' W, Height above Sea 110 feet.

Distance from Sea 57 miles. During the MONTH of August 1858.

Days of Week.	Days of Month.	BAROMETER.		SELF-REGISTERING THERMOMETERS.				HYGROMETER.				WIND.				RAIN.		CLOUD.	SUNSHINE.	THERMOMETERS. under Ground.			TEMPERATURE OF SPRING & FALL.	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.	Days of Month.		
		9 ^h A.M.		4 ^h P.M.		PROTECTED.		EXPOSED.		9 ^h A.M.		4 ^h P.M.		9 ^h A.M.		4 ^h P.M.				h. A.M.									
		Barometer.	Attached Thermometer.	Barometer.	Attached Thermometer.	Highest in Air.	Lowest in Air.	Max. Black bulb in Sun.	Min. Black bulb during Night.	Dry bulb.	Wet bulb.	Dry bulb.	Wet bulb.	Direction.	Force.	Direction.	Force.			Days on which it fell.	Amount.	3 inches.						12 inches.	22 inches.
		inches.		inches.																	lays.	inches.							
	1	29.10		29.03		66.7	34.8	82.8	27.8	53.7	50.2	52.4	52.0	SW	0	S	0	0	0						7	1			
	2	28.89		28.70		63.7	49.9	81.5	44.0	58.8	54.1	57.3	52.1	SW	1	S	15	0	0						9	2			
	3	28.66		28.56		66.2	53.8	82.5	50.2	57.3	53.9	56.9	52.9	SW	1	SW	1	0.18	0						10	3			
	4	28.66		28.60		58.4	47.8	85.2	44.2	54.8	51.0	52.9	51.6	W	0.2	S	0.2	0.03	0						10	4			
	5	28.67		28.72		63.0	45.9	87.6	74.3	57.4	50.0	49.2	48.0	SW	0.5	SW	1	0.04	0						9	5			
	6	28.39		29.09		62.3	42.9	87.8	38.2	56.0	51.5	53.0	46.8	SW	0	SW	1	0	0						9	6			
	7	29.16		29.18		70.3	43.2	82.0	40.0	56.7	52.0	55.1	53.0	SW	0	SW	1	0	0						9	7			
	8	29.21		29.26		77.0	47.0	83.0	43.2	61.2	54.8	56.0	52.2	SW	0	S	1	0	0						9	8			
	9	29.20		29.13		71.3	46.0	85.2	43.0	55.9	53.6	55.4	53.6	SW	0	S	0.2	0	0						7	9			
	10	29.03		29.07		69.8	47.9	85.2	43.0	57.3	56.0	56.0	54.8	SW	0	S	1	0	0						7	10			
	11	29.00		29.11		73.8	42.2	80.8	37.2	57.7	54.8	60.0	59.0	W	0	S	0.2	0	0						7	11			
	12	28.90		28.89		69.0	53.0	82.1	50.0	58.2	57.1	57.4	56.0	S	0	SW	0	0	0						7	12			
	13	28.84		28.86		68.0	52.7	82.0	49.2	59.6	58.6	60.1	58.1	SW	0	SW	0.5	0.25	0						7	13			
	14	28.85		28.82		69.0	50.0	83.2	47.0	59.2	57.8	58.8	56.7	S	0	S	0	0.03	0						7	14			
	15	28.74		28.74		63.8	53.2	87.6	84.6	56.9	55.8	52.0	52.0	SW	0	S	0	0.13	0						7	15			
	16	28.70		28.73		62.8	46.9	87.5	84.2	55.5	52.2	50.2	48.0	SW	0.5	SW	1	0.13	0						9	16			
	17	28.66		28.63		64.5	42.0	87.5	73.8	58.9	54.2	55.0	53.0	S	0	S	1	0.03	0						8	17			
	18	28.60		28.62		68.5	55.1	82.2	52.2	59.7	58.2	56.4	54.2	S	0.2	W	0.5	0.04	0						10	18			
	19	28.61		28.59		65.2	50.0	87.0	47.0	53.3	51.0	58.7	57.2	W	0	W	0	0	0						7	19			
	20	28.65		28.76		62.0	48.9	87.5	45.0	54.8	51.2	58.8	52.1	SW	0	SW	0.2	0.33	0						10	20			
	21	28.86		28.77		60.6	44.2	87.0	40.9	56.1	51.9	55.3	52.0	SW	0	SW	0.5	0	0						8	21			
	22	28.90		29.02		62.0	51.0	84.2	48.0	54.9	51.8	52.8	50.3	W	0	SW	0	0	0						10	22			
	23	29.03		29.03		69.1	40.8	85.8	38.0	52.6	49.2	54.3	54.3	SW	0	S	0.2	0	0						8	23			
	24	28.84		28.96		62.0	48.2	87.1	43.2	58.5	54.0	50.8	46.5	SW	0	SW	1	0	0						10	24			
	25	28.39		29.00		56.5	45.0	87.0	40.1	47.6	46.3	45.1	41.1	SW	0.5	SW	1	0.30	0						9	25			
	26	28.70		28.76		47.3	42.7	87.2	38.5	51.9	46.9	52.0	47.0	SW	1.5	SW	3	0.08	0						9	26			
	27	28.66		28.66		57.0	45.5	87.0	42.8	48.2	46.9	45.8	42.7	SW	0.5	W	3	0.09	0						10	27			
	28	28.70		28.62		53.0	43.0	87.0	40.5	47.0	47.4	47.3	45.2	W	3	S	0.2	0.10	0						9	28			
	29	28.82		28.40		52.2	40.8	83.6	37.0	49.2	46.2	47.0	46.8	SW	0	S	0	0	0						8	29			
	30	28.55		28.28		53.3	42.2	86.0	40.3	48.1	47.3	47.0	46.1	S	0	W	0	0.28	0						8	30			
	31	28.30		28.29		57.0	44.8	87.2	44.0	49.3	48.7	48.3	46.8	W	0	SW	0.2	0.30	0						8	31			
	Sums.	893.05		893.03		1972.8	1434.1	2350.3	1316.7	1711.9	1619.1	1639.8	1578.1		8.9		20.16	2008	207.2						26.2				
	Means.	28.808		28.807		63.6	46.2	75.8	42.4	55.2	53.2	52.8	50.9		0.28		0.65		6.6						8.4				
	Index Errors.	-.017		-.017		+	+	+	+	-	-	-	-																
	Correction for Diurnal Range.																												
	Corrected Means.	28.791		28.790		63.6	46.1	76.0	42.3	55.2	53.1	52.8	50.8		0.28		0.65		2008.6						8.4				
	No. of Column.	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	

Barometer, mean corrected reading of Column No. 1 (A.M.),.....= 28.791 Column No. 3 (P.M.),.....= 28.790 Barometer, Highest observed reading of Month,.....= 29.26 on the 8
Diameter of tube _____ inch; correction for capillarity to be added,.....+ 30 Capillarity,.....= + 30 Lowest do. do.,.....= 28.25 on the 30
Sum,..... 28.821 Sum,..... 28.820 Difference, or Monthly Range,.....= 1.01
Correction for Temperature from Column No. 2 to be deducted,.....= - 69 Temp. from Col. 3,.....= - 64
Sum,..... 28.752 Sum,..... 28.756
Mean of the above 28.754
Correction for Height above Sea-level, 110 feet, to add,..... 1.250
Barometer corrected and reduced to 32° and Sea-level, 30.004

SUMMARY OF THE WINDS.										
Direction.	N	NE	E	SE	S	SW	W	NW	Calm or Variable.	Mean Force.
A.M.	3	1	4	0	5	12	4	2	2	0.28
P.M.	1	0	3	2	11	10	3	1	8	0.65

Dry bulb Thermometer (mean of Cols. 9 and 11),*..... 54.0
Wet bulb Thermometer (mean of Cols. 10 and 12),*..... 51.4
† Dew-point Temperature,..... 48.8
† Elastic Force of Vapour,..... 34.4
† Weight of Vapour in a Cubic Foot of Air,.....
† Additional Weight required to Saturate a Cubic Foot,.....
† Degree of Humidity (Saturation 100),..... 82
Highest Reading Self-Registering Thermometer in Air and Protected,..... 77.0 on the 8
Lowest do. do. do.,..... 34.8 on the 1
Difference, being Monthly Range,..... 42.2
Mean of Self-Registering Thermometers in Air and Protected,..... 55.4
Mean Daily Range in Air and Protected,..... 17.2
Greatest Daily Range, do.,.....
Highest Reading Self-Registering Black Bulb Thermometer in Sun, 90.8 on the 11
Lowest do. do. from Radiation during Night, 29.8 on the 1

* 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) James Cameron M.D.
(Designation) Med. Officer

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.

SCOTTISH METEOROLOGICAL SOCIETY.

Observations taken at Broom's Barn, County of Shropshire, in Lat. 52° 41', Long. 2° 24' W, Height above Sea 1110 feet.
Distance from Sea 57 miles. During the MONTH of September 1858.

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.	Days of Month.				
		Barometer.	Attached Thermometer.	Inches.	Highest in Air.	Lowest in Air.	PROTECTED.		EXPOSED.		Dry bulb.	Wet bulb.	Dry bulb.	Wet bulb.	Direction.	Force.	Direction.	Force.			Days on which it fell.	Amount in inches.	1 to 10.							Hours.	8. 12. 22 inches.		
							Max. Black bulb in Sun.	Min. Black bulb during Night.	8.	12.																					22.		
																																9 h. A.M.	9 h. P.M.
	1	28.24		28.23	59.9	45.4	62.8	42.5	50.8	45.8	47.1	44.4	S.W.	1.5	S.W.	1	0.190	4										1					
	2	28.39		28.14	54.6	46.8	63.2	43.2	53.0	49.1	53.9	53.0	S.W.	1	S.W.	1.5	0.021	8							10			2					
	3	28.37		28.58	60.0	45.3	72.0	46.7	57.0	46.5	47.6	45.3	W	3	S.W.	1	0.120	3							10			3					
	4	28.45		28.50	56.7	38.0	78.2	37.0	50.7	47.8	46.3	44.6	S.W.	0	S.W.	1	0	2								10			4				
	5	28.57		28.50	57.7	35.6	74.8	33.5	52.0	48.0	43.1	41.9	S.W.	0	S.W.	0.5	0	4								7			5				
	6	28.46		28.36	52.5	33.8	61.0	31.0	46.9	44.1	51.8	50.3	S.W.	0	S.W.	1	0	5								9			6				
	7	28.43		28.54	60.0	44.2	77.5	38.5	55.0	50.1	44.2	42.7	S.W.	0	S.W.	0.5	0	7								8			7				
	8	28.64		28.70	59.0	42.0	74.2	37.7	49.9	44.1	47.2	44.7	W	0	S.W.	0.5	0	8								10			8				
	9	28.44		28.47	60.8	47.6	71.4	44.5	55.7	53.6	57.0	46.9	S	3	S.W.	3	0.030	10								10			9				
	10	28.50		28.34	56.8	45.1	64.3	42.5	51.0	44.4	49.7	46.8	S	1.5	S.W.	3	0.020	6								10			10				
	11	28.70		28.77	59.3	46.4	64.8	44.7	53.4	48.8	58.4	56.7	S.W.	5	S.W.	3	0.090	4								9			11				
	12	28.86		28.96	63.0	57.0	73.0	53.0	58.8	57.0	56.9	54.4	S.W.	4	S.W.	1.5	0	2								9			12				
	13	29.01		29.11	61.7	48.3	75.8	44.2	58.3	55.3	48.4	47.9	S.W.	1.5	S	0.5	0	6								10			13				
	14	29.16		29.04	59.0	38.9	74.0	36.0	45.3	44.2	44.5	43.9	S.W.	0	S.W.	0.5	0.170	cu								9			14				
	15	28.76		28.95	71.0	37.8	82.8	32.0	57.0	53.8	53.8	52.3	S.W.	0	S.W.	0.5	0	ccu								9			15				
	16	28.87		28.84	69.8	44.3	79.2	42.0	53.7	52.3	57.6	56.8	S.W.	0	S.W.	1	0	ccu								7			16				
	17	28.77		28.61	63.3	51.7	73.5	47.0	57.0	56.0	57.0	56.0	S.W.	0	S.W.	1	0	cu								7			17				
	18	28.62		28.92	59.7	43.9	71.1	39.0	53.1	51.2	43.9	43.0	S.W.	1	S.W.	1	0.120	2								8			18				
	19	29.06		29.10	61.3	54.7	82.0	51.5	64.9	63.2	44.3	43.8	S.W.	0	S	0	0	ccu								7			19				
	20	29.07		29.15	63.8	51.9	72.4	48.5	63.3	61.9	43.8	41.9	S	0	S.W.	0	0	3								5			20				
	21	29.07		29.01	66.2	58.3	85.1	56.5	57.0	56.0	39.7	38.8	S.W.	0	S.W.	0	0	ccu								7			21				
	22	28.86		28.70	57.0	38.9	70.0	36.5	40.7	39.0	52.3	50.6	S	0	S.W.	1	0	ccu								7			22				
	23	28.45		28.31	61.3	50.0	73.3	49.9	56.4	56.1	55.8	55.1	S	0	S.W.	0.5	0.390	7								7			23				
	24	28.74		29.04	57.2	46.2	57.8	44.0	46.2	43.7	48.1	45.1	S.W.	1	S.W.	1	0.373	4								10			24				
	25	29.00		29.15	62.8	47.9	73.8	47.0	56.7	52.2	56.2	54.0	S.W.	1.5	S.W.	5	0	2								10			25				
	26	29.20		29.07	64.6	53.8	76.9	45.5	57.0	53.3	58.0	55.7	S.W.	4	S.W.	4	0	4								9			26				
	27	28.82		28.75	62.9	49.0	74.9	47.0	60.9	57.4	49.0	46.7	S.W.	3	W	5	0	8								4			27				
	28	28.94		28.94	53.8	41.0	63.8	35.0	47.8	44.0	46.3	44.2	S.W.	3	S.W.	4	0	4								9			28				
	29	28.89		28.59	54.0	39.0	69.0	34.0	47.0	45.2	48.6	47.5	S.W.	0	S.W.	1	0	6								9			29				
	30	28.50		28.46	52.8	40.7	68.2	37.8	57.6	49.0	40.9	39.0	S.W.	0.5	S.W.	4	0.005	7								10			30				
	31																										10			31			
	Sums.	861.73		861.31	1998.7	1284.7	2113.8	1803.6	1642.1	1454.4	1485.4	1436.0	34.5	47.5	154.9	153.2										26.6							
	Means.	28.726		28.727	59.9	42.8	72.6	59.3	57.4	48.4	49.5	47.8	1.5	1.58	5.1										8.8								
	Index Errors.	-0.017		-0.017	-	+1	+2	-1	-	-1	-	-1																					
	Correction for Diurnal Range.																																
	Corrected Means.	28.709		28.710	59.9	42.9	72.8	59.2	57.4	48.3	49.5	47.7	1.5	1.58	5.1										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	27					
Barometer, mean corrected reading of Column No. 1 (A.M.).....= 28.709																																	
Column No. 3 (P.M.).....= 28.710																																	

Barometer, mean corrected reading of Column No. 1 (A.M.),.....= 28.709 Column No. 3 (P.M.),.....= 28.710
Diameter of tube _____ inch; correction for capillarity to be added,.....+ 30 Capillarity,.....= + 30
Sum,.....= 28.739 Sum,.....= 28.740
Correction for Temperature from Column No. 9 to be deducted,.....- 58 Temp. from Col. 4,.....= 53
Sum,.....= 28.681 Sum,.....= 28.687

Mean of the above

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

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

Dry bulb Thermometer (mean of Cols. 9 and 11),*.....52.4
Wet bulb Thermometer (mean of Cols. 10 and 12),*.....48.0
† Dew-point Temperature,.....45.5
† Elastic Force of Vapour,.....30.4 in.
† Weight of Vapour in a Cubic Foot of Air,.....
† Additional Weight required to Saturate a Cubic Foot,.....
† Degree of Humidity (Saturation 100),.....84

* 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.

SUMMARY OF THE WINDS.									
Direction.	N	NE	E	SE	S	SW	W	NW	Mean Force.
A.M.	-	1	1	1	7	17	3	-	15
P.M.	-	-	3	3	5	18	1	-	15.8

Highest Reading Self-Registering Thermometer in Air and Protected,.....71.2 on the 15
Lowest do. do. do.,.....28.3 on the 21
Difference, being Monthly Range,.....42.9
Mean of Self-Registering Thermometers in Air and Protected,.....57.4
Mean Daily Range in Air and Protected,.....17.0
Greatest Daily Range, do.,.....0
Highest Reading Self-Registering Black Bulb Thermometer in Sun,.....85.1 on the 24
Lowest do. do. from Radiation during Night,.....26.5 on the 24

(Signed) James Cameron M.D.
(Designation) J. H. Fraser

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.

SEPTEMBER 1858

To

DR STARK,

Sec., Meteorological Society,

21, Rutland Street,

EDINBURGH.

METEOROLOGICAL RETURNS.

Have the goodness also to state any information you may be able to collect relative to the Crops of Grain, Hay, Potatoes, Turnips, Fruits, etc., whether plentiful, or in perfection; and the agricultural condition of the district generally.

SHRUBS, ETC.	FRUITS.	MIGRATORY BIRDS.	First Depature.
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,.....	Swab,.....	
Mountain Ash or Rowan,.....	Strawberry,.....	Kill or Corn Crake,.....	
Red Flowering Currant,.....		Other Birds, naming them.....	
Rhododendron Ponticum,.....			
Winn,.....			

FOREST TREES.	CROPS.	First Cut
Alder,.....	Barley,.....	
Aspen,.....	Bent or Bigg,.....	
Beech,.....	Oats,.....	
Birch,.....	Wheat,.....	
Elm,.....	Beans,.....	
Larch,.....	Peas,.....	
Lime,.....	Potatoes,.....	
Oak,.....	Turnips,.....	
Sycamore or Plane,.....	Rye Grass,.....	

OBSERVATIONS IN CONNECTION WITH THE PERIODICAL RETURN OF THE SEASONS.

INSTRUCTIONS FOR MAKING METEOROLOGICAL OBSERVATIONS.

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

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

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

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

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

Self-Registering Thermometers and Hygrometers.—These should be placed alongside of each other, in a place freely exposed to the air, but protected from 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. Whichever means are finally decided on, the position of the instruments should be mentioned, and should not be changed (without the 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 *dew* 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 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, and feed from moisture to furnish 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 "Piemont's Rain Gauge" seems to possess several advantages over others, the Society gives the preference to them; but whatever form be employed, in order that all the stations may yield comparable results, it is recommended that the Gauge be sunk in the ground, so that the top of the receiver is nearly on a level with the top blades of *classe out grass*, in a place as distant as possible from trees, houses, high walls, and irregular or broken ground, and the quantity of Rain should, if possible, be registered daily. When more than one Rain Gauge is kept, they ought to be placed near each other, but at different heights above the ground, and then indications noted in the *general remarks*, mentioning their height above ground—the receiver column in the Schedule being reserved for the ground Rain Gauge alone.

Winds.—Isolated Wind-vanes or Weather-cocks are apt to give false indications of the general direction of the wind, in consequence of the currents of air at the surface of the ground being so much influenced by the neighbourhood of hills, valleys, buildings, etc. Where low clouds are seen drifting along their direction in reference to known objects, or as noted by means of a mirror on which a compass may be laid, or by means of a circular mirror fixed over the centre of a pocket compass, will, in general, give the true direction of the current of air near the earth's surface if these clouds are near and immediately overhead, that is, in or near the zenith of the observer. The motion of the higher strata of clouds gives no such indication. Failing the clouds, the general direction of the smoke of a hamlet or village, or of a tall chimney, gives a better indication of the general direction of the wind than any wind-vane. The observer should state whether he has ascertained the direction by reflection or otherwise. For mode of estimating the force of the wind, see "Directions for Reading Instruments," but in all cases it is better to make use of Lind's Anemometer, as pointed out by Messrs Adie and Son's, and enter the greatest force of the wind during the period of observation.

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 Remarks any facts bearing on this point, for a few days (or nights, as the case may be) before and after every full moon; and the same observations ought to be made at the periods of new moon.

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

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

Temperature of the Sea.—As the meteorology of the island is incomplete without a knowledge of the mean temperature of the Ocean which surrounds it, the Society strongly recommends taking the temperature of the Sea at a depth of 6 feet, or 1 fathom from the end of all piers or rocks round the coast, where free from the influence of river waters, and as near as may be about the time of high water. A Thermometer, with its bulb fixed in a small tin 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 instruments are furnished by Messrs Adie and Son.

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

Meteors, Auroral Displays, Remarkable Depressure or Elevation of Barometer, Renowned Fails of Rain, Hail or Snow, Thunder and Lightning, etc., should be specially noticed, together with the exact hour at which they were first seen, their continuance, and direction.

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

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

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

SCOTTISH METEOROLOGICAL SOCIETY.

Observations taken at Blaenau, County of Meriden, in Lat. 51° 11', Long. 3° 24' W, Height above Sea 1110 feet.Distance from Sea 57 miles.During the MONTH of October 1858.

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.	Days of Month.		
		7 ^h . A.M.		7 ^h . P.M.		PROTECTED.		EXPOSED.		7 ^h . A.M.		7 ^h . P.M.		7 ^h . A.M.		7 ^h . P.M.				h. A.M.									
		Barometer.	Attached Thermometer.	Barometer.	Attach- ed Ther- meter	Highest in Air.	Lowest in Air.	Max. Black bulb in Sun.	Min. Black bulb during Night.	Dry bulb.	Wet bulb.	Dry bulb.	Wet bulb.	Direction.	Force.	Direction.	Force.			Days on which it fell.	Amount.	3 inches.						12 inches.	22 inches.
		inches.		inches.																	inches.								
	1	28.37		28.32		51.0	36.0	61.0	33.7	48.5	44.8	37.0	35.9	SW	4	SW	5	0.005	6					9					
	2	28.48		28.30		53.1	36.0	59.2	36.6	44.2	39.7	32.7	30.3	W	4	SW	16	0.148	10					10					
	3	28.37		28.36		62.0	52.8	75.2	50.0	56.3	54.0	52.2	50.8	SW	4	SW	4	0	10					9					
	4	28.49		28.22		53.3	41.0	70.0	36.0	44.9	41.1	43.1	40.4	SW	15	SW	15	0.149	8					10					
	5	28.14		28.46		47.0	39.0	53.8	36.5	45.0	42.1	38.8	37.1	SW	5	SW	4	0.139	10					10					
	6	28.60		28.41		43.9	32.1	55.8	28.8	35.5	31.4	38.9	36.2	SW	3	SW	1	0.279	10					9					
	7	27.66		27.91		50.7	36.2	53.0	31.0	49.6	44.8	36.3	33.3	SW	3	SW	4	0.440	10					10					
	8	28.20		28.42		42.9	31.8	52.8	27.2	36.0	33.2	33.0	31.0	SW	4	SW	1	0.170	10					10					
	9	28.43		28.40		45.2	28.9	62.2	26.0	37.3	35.6	39.9	39.0	SW	2	SW	0.5	0	10					10					
	10	28.20		28.11		44.9	39.8	65.7	37.0	43.2	42.8	40.2	40.2	W	0	SW	0.2	0.050	10					9					
	11	28.32		28.42		46.9	38.8	62.2	36.0	41.1	38.0	40.2	39.0	W	1	SW	1	0.478	10					10					
	12	28.50		28.45		45.0	36.1	68.0	31.2	40.6	37.8	43.9	42.8	SW	15	SW	1	0.015	10					9					
	13	28.60		28.83		53.6	43.8	64.2	38.7	46.0	42.8	45.9	42.8	SW	1	SW	1	0.059	10					10					
	14	28.63		28.68		58.0	43.4	61.2	39.8	48.8	48.0	45.8	42.1	SW	1	SW	1	0.005	10					10					
	15	28.82		28.70		48.0	39.0	68.0	38.5	43.3	41.9	39.0	38.7	SW	0.2	SW	0	0.005	10					9					
	16	28.69		28.69		45.2	38.3	69.6	38.0	40.1	39.8	43.4	42.8	SW	0	SW	0.2	0.150	10					8					
	17	28.76		28.81		44.8	36.8	64.8	33.0	38.3	37.7	35.1	32.8	SW	1	SW	0.2	0.440	10					10					
	18	28.82		28.96		38.8	30.2	54.1	30.0	31.1	30.6	36.0	33.3	SW	0.2	SW	0.5	0.040	10					10					
	19	29.00		28.95		41.8	32.5	56.3	29.5	36.0	34.3	36.9	35.6	SW	0	SW	0.5	0.062	10					7					
	20	28.79		28.75		43.2	36.2	57.9	30.2	37.6	37.1	40.7	40.3	SW	0	SW	0	0.091	10					9					
	21	28.75		28.80		51.0	32.5	53.0	30.0	39.0	38.7	31.1	30.9	SW	0	SW	0	0.050	10					9					
	22	28.86		28.96		50.5	24.0	69.9	23.5	25.9	25.9	30.7	30.0	SW	0	SW	0	0	10					7					
	23	28.96		28.96		47.0	22.9	64.0	20.3	24.0	24.0	32.3	31.8	SW	0	SW	0	0	10					5					
	24	28.96		29.03		50.0	36.8	57.8	34.0	38.5	38.0	40.1	38.9	SW	0	SW	0	0	10					5					
	25	29.11		29.11		53.8	33.0	70.8	27.0	33.7	33.1	33.3	32.9	SW	0	SW	0	0	10					7					
	26	29.03		28.94		50.4	28.9	60.5	26.0	31.0	30.4	30.2	29.3	SW	0	SW	1	0	10					8					
	27	28.86		28.88		43.0	42.2	53.4	38.7	50.1	48.0	42.6	40.0	SW	15	SW	0.5	0.020	10					8					
	28	28.90		29.08		45.7	32.2	57.0	30.5	36.9	36.2	32.2	30.7	SW	0	SW	0.2	0.010	10					8					
	29	29.26		29.32		38.0	30.1	53.5	25.2	33.5	31.9	29.3	28.6	W	0.5	SW	0	0.035	10					9					
	30	29.29		29.25		46.2	26.9	65.0	21.0	36.3	34.0	44.2	43.0	SW	0	SW	0.2	0	10					9					
	31	29.30		29.34		57.9	44.0	70.2	42.5	50.0	48.0	47.4	46.8	SW	1	SW	0	0.053	10					8					
Sums.		889.15		889.82		1495.8	1094.8	1909.9	1004.6	1242.3	1188.7	1230.5	1185.2	38.4		37.5	23	27.4	349.5					271					
Means.		28.682		28.703		48.2	35.3	57.7	32.4	40.0	38.3	39.6	38.2	1.23		1.04			6.4					8.7					
Index Errors.		-0.11		-0.17		-	-	+2	-	-	-	-	-																
Correction for Diurnal Range.																													
Corrected Means.		28.665		28.686		48.2	35.4	57.9	32.3	40.0	38.2	39.6	38.1	1.23		1.04			6.4					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	27	

Barometer, mean corrected reading of Column No. 1 (A.M.).....= 28.665 Column No. 3 (P.M.).....= 28.686
 Diameter of tube inch; correction for capillarity to be added.....+ 30 Capillarity.....= + 30
 Sum..... 28.695 Sum..... 28.716
 Correction for Temperature from Column No. 1 to be deducted.....= - 30 Temp. from Col. 4.....= - 30
 Sum..... 28.665 Sum..... 28.686

Mean of the above 28.675
 Correction for Height above Sea-level, 1110 feet, to add..... 1.250
 Barometer corrected and reduced to 32° and Sea-level, 29.925

Dry bulb Thermometer (mean of Cols. 9 and 11),*..... 39.8
 Wet bulb Thermometer (mean of Cols. 10 and 12),*..... 38.1
 † Dew-point Temperature..... 35.8
 † Elastic Force of Vapour..... 0.211 inch
 † Weight of Vapour in a Cubic Foot of Air..... 2.45
 † Additional Weight required to Saturate a Cubic Foot.....
 † Degree of Humidity (Saturation 100)..... 86.

* 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.

Barometer, Highest observed reading of Month.....= 29.34 on the 31st
 Lowest do.....= 27.66 on the 7th
 Difference, or Monthly Range,.....= 1.68

SUMMARY OF THE WINDS.										
Direction.	N	NE	E	SE	S	SW	W	NW	Calm or Variable.	Mean Force.
A.M.	2	4	1	2	4	15	2	1	1	1.23
P.M.	1	5	1	2	3	17	1	1	1	1.04

Mean 1.14

1 1/2 4 1/2 1 2 3 1/2 16 1 1/2 1

Highest Reading Self-Registering Thermometer in Air and Protected, 63° on the 30th
 Lowest do..... 23° on the 23rd
 Difference, being Monthly Range..... 39.0
 Mean of Self-Registering Thermometers in Air and Protected, 41.8
 Mean Daily Range in Air and Protected, 12.8
 Greatest Daily Range, do., 26.26
 Highest Reading Self-Registering Black Bulb Thermometer in Sun, 75.4 on the 30th
 Lowest do..... 20.5 on the 20th
 from Radiation during Night, 20.5

(Signed) James Cameron
 (Designation) John Pearce

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

OCTOBER 1858

Tg

DR STARK.

Sec., Meteorological Society,

21, Rutland Street.

EDINBURGH.

METEOROLOGICAL RETURNS.

OBSERVATIONS IN CONNECTION WITH THE PERIODICAL RETURN OF THE SEASONS.

FOREST TREES.				FRUITS.				MIGRATORY BIRDS.			
In flower.	Leaf first appear.	In leaf.	Divided of leaves.	First in blossom.	First in fruit ripe.	First in generally.	First in ripe	First arrival.	Departure.		
Alder,					Apple,		Cuckoo,				
Ash,					Black Currant,		Curlew,				
Beech,					Cherry,		House-Swallow,				
Birch,					Gooseberry,		Lapwing,				
Elm,					Holly,		Plover,				
Larch,					Peach,		Sand-Martin,				
Plane,					Pear,		Starling,				
Oak,					Plum,		Swan,				
Sycamore or Plane,					Strawberry,		Rail or Corn Crane,				
							Other Birds, naming them—				

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 :

How? *Observation*.—Arrangements 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.

Leontine—The measures of Messrs. Adie and Son's construction are recommended; but any instruments may be used which have adjustable supports, and have been compared. Before this instrument is supplied 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 out 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 Brahmee should be living in a good light, and perfectly independent, 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 taking, as the heat of the breath, or the proximity of the person, are apt to influence the readings.

The corrections necessary for the application of 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 a Report of the Committee of the Royal Society on Physics and Meteorology,¹ 1840, pp. 15. The daily readings of the Barometer ought to be entered on the Schedule as *read, self-registering, thermometer and hygrometer*.—These should be placed alongside of each other, in a place freely exposed to the air, but protected from sunshine, and from reflected heat, as well as from pollution 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-stair 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 rising 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 readings 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 *maumt* 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 Keatinger Jemometry, 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 dry.

[illegible]

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.

From Grass—As a Vienna's main Garages 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 Garages be level in the ground, so that the top of the receiver is nearly on a level with the top blades of *close cut grass*, in a place as distant as possible from trees, hedges, high walls, and irregular or broken ground, and the grass of plain soil, if possible, be registered daily. When more than one Rain Gauge is kept, they ought to be placed near each other, but at different heights above the ground, and their indicators noted in the *general remarks*, mentioning their height above ground—the register column in the *Journal* being reserved for the ground Rain Gauge alone, the Schindler being reserved for the ground Rain Gauge above.

Winds—sourced Wind-mills and 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 across their direction in reference to known objects, or as noted by means of a mirror on which a compass may be laid, or by means of a circular mirror fixed over the centre of a pocket compass, will, in general, give the true direction of the current of air near the earth's surface; if these clouds are near and immediately over head, that is, in or near the zenith of the observer. The motion of the higher parts of clouds gives no such indication. Finding the clouds, the

general direction of the smoke of a hammel or village, or of a tall chimney, gives a better indication of the general direction of the wind than any wind-vane. The observer should state whether he has ascertained the direction by reflection or otherwise. For notice of estimating the force of the wind, see "Directions for Reading Instruments,"² but in all cases it is better to make use of *Linds Anemometer*, as pointed out Messrs. Adie and Sons, and enter the greatest force of the wind during the period of observation.

Clouds—the Society recommends observers to adopt the Howard nomenclature of clouds. The scale of cloud in the visible sky is 0; a sky half covered with cloud is 5; and the 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 competent astronomers to have a powerful effect in dissipating clouds, it would be well to note in the General Remarks of the case may be before and after every full moon; and the same observations ought to be made at the periods of new moon. *Sunshine*—The number of hours the sun shines during the day should be entered in the paper column.

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

Temperature of the Sea.—As the meteorology of the island is incomplete without a knowledge of the mean temperature of the Ocean which surrounds it, the Society strongly recommends that the temperature of the Sea at a depth of 6 feet or 1 fathom from the edge of all piers or rocks round the coast, shall be taken from the influence of these waters, and not near as may be about the surface of high water. A thermometer, with its bulb fixed in a small tin pincette, covered with a sopping lid, and with a weight attached, is sunk to the required depth, and in ten minutes drawn up and read. Inherent in thermometers are furnished by Messrs. Adie and Son.

Temperature of Springs.—The temperature of Springs or Deep Wells is recommended to be taken whenever practicable, mentioning whether Spring or Well, and its depth from the surface. *Measurs*, *Alvina Borealis*, *Remarkable Depression or Elevation of Barometery*, *Remarkable Falls of Steam*, *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, early, 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 from year to year being noticed.

Zeami—a question whether Scholombien's or Mother's soul and her companions are real. Scholombien is performed. They may be had at Messrs Adie and Sons', 50, Princes Street, and at Mr. Thompson's, 60, Princes Street, Edinburgh.

Electricity.—Pith balls suspended by a linen thread in connection with a metallic conductor, and under cover; and the degrees of repulsion and attraction of the same, ascertained by the use of a circle being used to express the degree of repulsion, form a cheap and convenient Bacterometer. Etched glass on sealing-wax ascertains the nature of the electricity.

SCOTTISH METEOROLOGICAL SOCIETY.

Observations taken at Macrae, County of Shetland, in Lat. 57°N, Long. 2°W, Height above Sea 1110 feet.
Distance from Sea 77 miles. During the MONTH of December 1858.

Days of Week.	Days of Month.	BAROMETER.		SELF-REGISTERING THERMOMETERS.				HYGROMETER.				WIND.				RAIN.		CLOUD.	SHADE.	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.	Days of Month.		
		9 ^h A.M.		9 ^h P.M.		PROTECTED.		EXPOSED.		9 ^h A.M.		9 ^h P.M.		9 ^h A.M.		9 ^h P.M.				Days on which it fell.	Amount.	h. A.M.							
		Barometer.	Attached Thermometer.	Barometer.	Attached Thermometer.	Highest in Air.	Lowest in Air.	Max. Black bulb in Sun.	Min. Black bulb during Night.	Dry bulb.	Wet bulb.	Dry bulb.	Wet bulb.	Direction.	Force.	Direction.	Force.					3 inches. 12 inches. 22 inches.							
																						inches.						"	inches.
	1	29.28		29.25		57.8	37.4	56.7	32.7	45.8	45.3	37.4	37.0	N.W.	0	N.W.	0	0	0					5			1		
	2	29.21		29.22		48.7	27.6	62.9	25.7	47.8	47.3	45.1	43.3	N.W.	0	N.W.	0	0	0					7			2		
	3	29.15		29.18		48.2	43.0	50.8	39.0	45.2	44.8	45.0	44.1	N.W.	0	N.W.	0	0.005	0.005					8			3		
	4	29.13		29.08		47.4	42.0	49.1	35.7	43.0	41.4	43.2	41.2	N.W.	0	N.W.	0	0.028	0.028					9			4		
	5	29.06		29.25		46.0	32.0	46.2	30.0	37.8	36.9	32.3	31.0	N.E.	1	N.E.	1	0.065	0.065					9			5		
	6	29.35		29.36		35.0	32.2	38.8	29.5	33.3	31.9	33.2	31.8	N.E.	0.2	N.E.	0.2	1.030	1.030					9			6		
	7	29.31		29.25		43.3	31.2	50.0	30.0	32.8	31.7	40.4	39.2	N.W.	0.5	N.W.	0.5	2.003	2.003					9			7		
	8	29.21		29.24		45.9	39.0	62.1	34.2	41.7	39.9	38.1	37.9	N.E.	0	N.E.	0	0.022	0.022					9			8		
	9	29.26		29.26		44.0	31.8	55.0	28.0	32.3	32.0	39.2	38.0	N	0	N	0	0	0					8			9		
	10	29.23		29.22		41.5	29.8	56.7	27.0	35.2	34.8	35.2	34.8	N.E.	0	N.E.	0	0	0					8			10		
	11	29.16		29.06		41.0	34.0	43.2	33.0	34.3	34.0	37.7	36.2	N	0	N	0	0	0					8			11		
	12	28.87		28.75		42.3	29.2	54.2	26.7	30.9	30.2	29.2	28.8	N.W.	0	N.W.	0.5	0	0					5			12		
	13	28.61		28.57		38.8	23.0	40.7	20.5	22.4	22.2	43.8	36.1	N.E.	0	N.E.	0	0	0					8			13		
	14	28.57		28.75		39.0	35.4	57.8	31.0	31.8	31.1	35.3	33.1	N	0.5	N	0.5	0.091	0.091					7			14		
	15	28.79		28.72		36.2	33.3	40.5	31.0	34.6	32.0	34.2	31.3	N.E.	0.2	N.E.	0.2	0.091	0.091					8			15		
	16	28.61		28.52		35.3	32.9	38.8	31.0	33.3	31.2	32.9	31.8	N	0	N	0	0.020	0.020					8			16		
	17	28.53		28.60		39.0	25.6	53.9	23.5	28.0	28.0	25.6	25.6	N.E.	0	N.E.	0	0	0					8			17		
	18	28.58		28.60		35.7	22.5	55.7	19.0	22.1	22.1	26.0	25.8	N	0	N	0.8	0	0					7			18		
	19	28.49		28.60		37.5	21.2	56.8	16.5	32.0	30.0	25.6	25.3	N.E.	0.5	N.E.	0.5	0	0					7			19		
	20	28.75		28.86		29.8	11.0	41.2	9.0	15.6	15.6	11.0	11.0	N.E.	0	N.E.	0	0	0					8			20		
	21	28.92		28.98		34.2	11.0	41.3	7.5	19.5	19.0	30.9	30.9	N.W.	0	N.W.	0.8	0	0					8			21		
	22	28.95		28.92		39.0	28.7	46.8	24.5	29.8	29.0	31.3	30.2	N.W.	0	N.W.	0	0	0					8			22		
	23	28.83		28.79		35.2	28.9	38.8	24.8	28.0	27.7	33.0	32.5	N	0	N	0.2	0	0					8			23		
	24	28.66		28.54		36.2	31.7	36.0	30.0	31.8	31.2	35.7	34.0	N	0	N	0	0.040	0.040					8			24		
	25	28.33		28.04		41.0	35.2	44.1	33.7	37.3	36.1	40.4	39.7	N	0.2	N	0.2	0.019	0.019					8			25		
	26	27.90		27.87		47.7	40.0	47.7	38.0	44.8	44.1	46.9	45.7	N	1.5	N	1.5	0.480	0.480					9			26		
	27	27.84		27.71		49.2	42.2	50.5	40.5	46.1	45.2	42.2	41.8	N.E.	0	N.E.	0	0.233	0.233					10			27		
	28	27.74		27.84		46.5	40.8	48.0	36.2	44.0	43.2	44.0	39.8	N.W.	0.5	N.W.	0.5	0.068	0.068					9			28		
	29	27.84		27.92		43.0	38.4	43.2	33.2	38.2	38.1	39.2	39.0	N.E.	0	N.E.	0	0.010	0.010					8			29		
	30	27.97		28.22		42.8	31.8	42.8	30.5	31.1	31.0	42.4	40.8	N	0.2	N	0.2	0.040	0.040					8			30		
	31																										31		
	Sums.	862.16		862.20		12382	9428	14116	8579	10105	9872	10676	10377		5.3			2.297	2.297					240					
	Means.	28.738		28.740		41.2	31.4	47.0	28.3	33.6	32.9	35.5	34.5		0.17			7.63	7.63					8.0					
	Index Errors.	-0.009		-0.009		-1	-1	-1	-1	-1	-1	-1	-1																
	Correction for Diurnal Range.			-0.017																									
	Corrected Means.	28.729		28.731		41.2	31.5	47.2	28.2	33.6	33.0	35.5	34.6		0.17			7.63	7.63					8.0					
	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	27	

Barometer, mean corrected reading of Column No. 1 (A.M.).....= 28.729 Column No. 3 (P.M.).....= 28.731
Diameter of tube 0.4 inch; correction for capillarity to be added.....+ 0.07 Capillarity.....= + 0.07
Sum..... 28.736 Sum..... 28.738
Correction for Temperature from Column No. 3 to be deducted, 34.0° = - 0.14 Temp. from Col. 3.....= 0.17
Sum..... 28.722 Sum..... 28.721

Mean of the above..... 28.721
Correction for Height above Sea-level, 1110 feet, to add..... 1.250
Barometer corrected and reduced to 32° and Sea-level,..... 29.971

Dry bulb Thermometer (mean of Cols. 9 and 11),*..... 34.5
Wet bulb Thermometer (mean of Cols. 10 and 12),*..... 33.6
† Dew-point Temperature..... 32.1
† Elastic Force of Vapour..... 186 mbs
† Weight of Vapour in a Cubic Foot of Air.....
† Additional Weight required to Saturate a Cubic Foot.....
† Degree of Humidity (Saturation 100)..... 91

* 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.

Highest Reading Self-Registering Thermometer in Air and Protected,..... 51.8 on the 1st
Lowest do. do. do. 11.0 on the 20th
Difference, being Monthly Range..... 40.8
Mean of Self-Registering Thermometers in Air and Protected,..... 36.3
Mean Daily Range in Air and Protected,..... 9.7
Greatest Daily Range, do.
Highest Reading Self-Registering Black Bulb Thermometer in Sun,..... 62.9 on the 2nd
Lowest do. do. do. from Radiation during Night, 7.5 on the 21

SUMMARY OF THE WINDS.											
Direction.	N	NE	E	SE	S	SW	W	NW	Calor or Variable.	Mean Force.	
A.M.	1	6	1	4	6	10	2	-	56	0.18	Mean
P.M.	1	2	6	8	5	6	2	-	28	0.11	0.18
	1	4	3½	6	5½	8	2				

(Signed) James Cameron M.D.
(Designation) Th. Sec.

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

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

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

Self-Registering Thermometers and Hygrometers.—These should be placed alongside of each other, in a place freely exposed to the air, but protected from 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 near-side 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 readings, 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 thickened 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 same covering, it to be often changed. In towns once a month, or oftener, if the weather is dusty, and the mist gets foul; in the country whenever the mist seems to be felt. The bulb should be covered with thin tissue or blotting paper below the misting, and the misting 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 caustic 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 misting, the evaporation from the ice going on as from the simply wetted bulb.

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

Winds.—Isolated Wind-vanes or Weather-cocks are apt to give false indications of the general direction of the wind, in consequence of the currents of air at the surface of the ground being so much influenced by the neighbourhood of hills, valleys, buildings, etc. Where low clouds are seen drifting along, their direction in reference to known objects, or as noted by means of a mirror on which a compass may be laid, or by means of a circular mirror fixed over the centre of a pocket compass, will, in general, give the true direction of the current of air near the earth's surface; if these clouds are near and immediately overhead, that is, in or near the zenith of the observer. The notion of the higher strata of clouds gives no such indication. Failing the clouds, the general direction of the smoke of a chimney 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 otherwise. For mode of estimating the force of the wind, see "Directions for Reading Instruments," but in all cases it is better to make use of Lind's Anemometer, as procured at Messrs. A. D. and Son's, and enter the greatest force of the wind during the period of observation.

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

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

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

Temperature of the Sea.—As the meteorology of the island is incomplete without a knowledge of the mean temperature of the Ocean which surrounds it, the Society strongly recommends taking the temperature of the Sea at a depth of 6 feet or 1 fathom from the end of all piers or rocks round the coast, where free from the influence of river water, and as near as may be about the time of high water. A thermometer, with its bulb fixed in a small tin pail, covered with a sloping lid, and with a weight attached, is sent to the required depth, and in ten minutes drawn up and read.

Convenient Instruments.—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.

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.

Vines.—Mention whether Schonholts's or Millie's scale and papers are used. Schonholts's are preferred. They may be had at Messrs. A. D. and Son's, 50, Princes Street, at Mr. Brown's, 60, Princes Street, Edinburgh.

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

OBSERVATIONS IN CONNECTION WITH THE PERIODICAL RETURN OF THE SEASONS.

FOREST TREES.	In Flower.	Leaf first appear.	In Leaf.	Dressed of Leaves.	CROPS.	Sowing or Ploughing or above ground.	Apparatus.	In Ear.	First Cut
Alder,					Barley,				
Aspen,					Bare or Bligh,				
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 in general.	First in general.	First in general.	First in general.	First in general.	First in general.
Barberry,		Apple,		Cuckoo,		Curlew,		House-Swallow,	
Broom,		Cherry,		Lapwing,		Plover,		Sand-Martin,	
Hawthorn,		Gooseberry,		Starling,		Swain,		Other Birds, naming them,	
Holly,		Peach,		Plum,		Strawberry,		Mountain Ash or Rowan,	
Lilac,		Laburnum,							
Mezereum,									
Red Flowering Currant,									
Rhododendron Ponticum,									
Viburnum,									

Have the goodness also to state any information you may be able to collect relative to the Crops of Grain, Hay, Potatoes, Turnips, Fruits, etc., whether any have suffered from blight, 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,

METEOROLOGICAL RETURNS.

NOVEMBER 1858

To

Mr

Prudman

(H)

SCOTTISH METEOROLOGICAL SOCIETY.

Observations taken at Barra, County of Highland, in Lat. 57°N, Long. 8°W, Height above Sea 1110 feet.
Distance from Sea 57 miles. During the MONTH of December 1858.

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.	Days of Month.				
		9 ^h A.M.		4 ^h P.M.		PROTECTED.		EXPOSED.		9 ^h A.M.		4 ^h P.M.		9 ^h A.M.		4 ^h P.M.				h. A.M.											
		Barometer.	Attached Thermometer.	Barometer.	Attached Thermometer.	Highest in Air.	Lowest in Air.	Max. Black bulb in Sun.	Min. Black bulb during Night.	Dry bulb.	Wet bulb.	Dry bulb.	Wet bulb.	Direction.	Force.	Direction.	Force.			Days on which it fell.	Amount.	3 inches.						13 inches.	22 inches.		
		inches.		inches.																	inches.										
	1	28.40		28.22		42.1	32.0	46.0	22.8	31.2	31.0	40.7	40.3	S	0	S	0	0.101	6												
	2	28.28		28.46		47.5	36.8	46.3	33.5	45.2	43.5	36.8	35.4	SW	3	SW	1.5	0.038	3							9					
	3	28.56		28.43		51.0	36.5	52.0	32.0	43.1	41.1	50.3	48.2	SW	1	SW	1	0.010	8							10					
	4	28.45		28.66		50.8	40.7	51.7	36.3	43.3	41.6	40.7	39.4	SW	1	SW	1.5	0.071	3							9					
	5	28.69		28.85		45.0	35.4	49.9	30.5	38.2	37.4	37.7	36.9	SW	0.5	SW	0.2	0.021	4							9					
	6	28.87		28.89		47.0	38.0	48.0	35.0	45.2	42.9	42.3	40.3	SW	2	SW	0.5	0	6							9					
	7	28.86		28.85		46.0	40.9	44.2	38.0	42.8	40.3	41.0	39.2	SW	1	SW	1	0	5							8					
	8	28.89		28.94		44.8	38.4	42.2	32.1	36.0	35.3	37.3	36.4	SW	1	SW	1.5	0	8							8					
	9	28.95		28.98		40.2	37.0	42.0	33.0	38.8	36.7	37.2	36.2	SW	0	SW	0.5	0	6							8					
	10	28.94		28.92		41.7	32.8	44.7	32.0	33.4	32.1	34.4	33.8	S	0.2	SW	1	0	10							8					
	11	28.86		28.76		39.5	34.4	43.3	33.5	37.1	36.2	38.8	37.5	SW	1	SW	1	0	10							8					
	12	28.65		28.46		41.1	37.5	44.1	37.9	37.5	37.9	37.5	40.1	S	0.5	SW	1	0	10							10					
	13	28.46		28.68		46.2	34.5	46.2	30.2	37.9	37.8	36.6	34.1	SW	0.2	SW	0	0.385	10							8			Fog		
	14	28.84		28.94		36.2	26.0	48.6	22.0	26.8	25.0	33.0	31.0	SW	0	SW	0	0	8							9					
	15	28.92		28.89		35.8	26.7	38.7	23.0	26.7	26.3	31.9	29.5	W	0.2	SW	0.5	0	10							8					
	16	28.67		28.75		37.4	31.0	37.4	28.7	35.0	34.0	36.9	36.8	SW	1.5	SW	1	0.040	10							9					
	17	28.76		28.52		38.4	30.2	38.4	35.0	36.2	36.2	36.9	36.5	SW	0	SW	0	0.130	10							9					
	18	28.44		28.84		40.7	33.7	40.7	32.2	37.1	36.2	38.7	38.0	SW	0.5	SW	1.5	0.040	10							8					
	19	27.90		28.00		40.1	34.0	40.1	31.7	33.3	34.4	34.8	33.5	SW	3	SW	1.5	0.060	10							10					
	20	27.96		28.13		41.1	34.0	41.1	32.7	37.8	37.0	37.7	36.2	SW	2	SW	1	0.051	9							10					
	21	28.13		27.86		45.3	37.2	45.3	35.8	38.5	38.0	38.8	37.8	SW	1	SW	3	0.187	10							9					
	22	27.71		27.90		42.0	37.9	42.0	36.2	38.7	37.8	41.2	39.6	SW	3	SW	3	0.572	10							9					
	23	27.95		27.72		41.8	38.2	41.8	36.5	38.0	37.2	39.1	38.1	SW	0.5	SW	0.5	0.388	8							9					
	24	27.95		28.15		41.0	33.0	46.0	29.5	37.1	36.8	33.1	32.0	SW	0	SW	0	0.140	9							9					
	25	28.20		28.13		35.5	26.1	37.1	26.1	31.8	31.1	36.1	36.1	S	0	SW	0	0.040	9							9					
	26	28.01		28.00		36.3	25.8	36.3	25.2	30.0	29.8	35.8	33.3	W	0	SW	0	0.020	10							9					
	27	28.01		28.25		36.9	31.7	36.9	30.0	31.3	31.3	32.8	32.5	W	0	SW	0	0.058	9							8					
	28	28.32		28.32		36.8	32.1	45.5	28.5	33.2	32.8	32.1	31.5	SW	0	SW	0.2	0.038	4							8					
	29	28.52		28.78		36.7	31.8	43.0	26.0	30.8	30.8	35.3	33.7	SW	0.2	SW	0.5	0	4							10					
	30	28.70		28.82		41.2	34.2	44.2	32.5	36.1	35.9	36.8	36.8	SW	0.5	SW	0	0.140	10							9					
	31	28.84		28.75		46.7	34.5	46.7	33.0	38.2	37.9	46.6	45.0	SW	0	SW	1	0.010	8							10					
	Sums.	882.19		882.79		1290.9	1056.6	1353.9	977.7	1128.7	1102.5	1160.0	1128.0	238	26.9	238	26.9	227									274				
	Means.	28.457		28.477		41.6	34.0	43.7	31.5	36.4	35.5	37.4	36.3	0.76	0.88			7.3									8.8				
	Index Errors.	-0.009		-0.009		-	+1	+2	-1	-	-1	-	-1																		
	Correction for Diurnal Range.																														
	Corrected Means.	28.448		28.468		41.6	34.1	43.9	31.4	36.4	35.4	37.4	36.2	0.76	0.86			7.3									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	27			

Barometer, mean corrected reading of Column No. 1 (A.M.).....= 28.448 Column No. 3 (P.M.).....= 28.468
Diameter of tube 0.4 inch; correction for capillarity to be added.....+ 0.07 Capillarity.....= + 0.07
Sum..... 28.455 Sum..... 28.475
Correction for Temperature from Column No. 2 to be deducted.....- 19 Temp. from Col. 2.....= 21
Sum..... 28.436 Sum..... 28.454

Mean of the above..... 28.450
Correction for Height above Sea-level, 1110 feet, to add..... 1.250
Barometer corrected and reduced to 32° and Sea-level,..... 29.700

Dry bulb Thermometer (mean of Cols. 9 and 11),..... 36.9
Wet bulb Thermometer (mean of Cols. 10 and 12),..... 35.8
† Dew-point Temperature,..... 34.3
† Elastic Force of Vapour,..... 1.98 inch
† Weight of Vapour in a Cubic Foot of Air,..... 2.39 lbs
† Additional Weight required to Saturate a Cubic Foot,.....
† Degree of Humidity (Saturation 100),..... 97

* 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.

(Signed) James Cameron M.D.
(Designation) Thos. Pearce

SUMMARY OF THE WINDS.											
Direction.	N	NE	E	SE	S	SW	W	NW	Calm or Variable.	Mean Force.	
A.M.	1	—	—	1	11	13	5	—	19	0.76	Mean
P.M.	—	1	2	2	7	18	1	—	8	0.86	0.81

$\frac{1}{2}$ $\frac{1}{2}$ $1\frac{1}{2}$ 9 $15\frac{1}{2}$ 3

Highest Reading Self-Registering Thermometer in Air and Protected,..... 51.0 on the 3
Lowest do. do. do. 25.8 on the 26
Difference, being Monthly Range,..... 25.2
Mean of Self-Registering Thermometers in Air and Protected,..... 37.8
Mean Daily Range in Air and Protected,..... 7.5
Greatest Daily Range, do.
Highest Reading Self-Registering Black Bulb Thermometer in Sun,..... 52.1 on the 25
Lowest do. do. from Radiation during Night,..... 22.0 on the 14

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, however, to be at the same hour, and this hour entered on the Schedule.

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

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

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

Self-registering Thermometers and Hygrometers.—These should be placed alongside of each other, in a place freely exposed to the air, but protected from sunshine, and from reflected heat, as well as from radiation and from rain, and as near as may be, *just* from the general surface of the ground. Different ranges 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-side painted 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 the 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 black-enamelled box, whose sides should be so high as to protect the bulb from wind. It should be so placed that the sun's rays have free access to it during the heat of the day.

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

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

must be poured over the wet bulb, so as to form a thin film of ice on the wick, 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, and the quantity of Rain should, if possible, be registered daily. When more than one Rain Gauge is kept, they ought to be placed near each other, but at different heights above the ground, and their indications noted in the general remarks, mentioning their height above ground—the receiver 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, with, in general, give the true direction of the current of air near the earth's surface if these clouds are near and immediately overhead, that is, in or near the zenith of the observer. The motion of the highest 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. For mode of estimating the force of the wind, see "Directions for Reading Instruments," but in all cases it is better to make use of Lind's Anemometer, as procured at Messrs. Aitch and Son's, and enter the greatest force of the wind during the period of observation.

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 Remarks any facts bearing on this point, for a few days (or nights, as the case may be) before and after every full moon; and the same observations ought to be made at the periods of new moon.

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

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

Temperature of the Sea.—As the meteorology of the island is incomplete without a knowledge of the mean temperature of the Ocean which surrounds it, the Society strongly recommends taking the temperature of the Sea at a depth of 6 feet or 1 fathom from the end of all piers or rocks round the coast, where free from the influence of river waters, and as near as may be about the time of high water. A Thermometer with its bulb fixed in a small tin bucket, 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 instruments are furnished by Messrs. Aitch and Son.

Temperature of Springs.—The temperature of Springs or Deep Wells is recommended to be taken whenever practicable, mentioning whether Spring or Well, and its depth from the surface. *Microns, Aurora Borealis, Unusually Low Depression or Elevation of Barometer, Remarkable Falls of Rain, Fall 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, Leaking, and Flooding of Rivers.—It is necessary to bear in mind that varieties of the same species of trees 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 Schobert's or Maffei's scale and papers are used. Schobert's are preferred. They may be had of Messrs. Aitch and Son's, 50, Fintona Street, and at Mr. Bryson's, 60, Fintona Street, Edinburgh.

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

OBSERVATIONS IN CONNECTION WITH THE PERIODICAL RETURN OF THE SEASONS.

FOREST TREES.	In flower.	Leaf buds first appear.	In leaf.	Dressed of leaves.	CROPS.	Sowing or planting.	Above ground.	Appearing or in flower.	In ear or first cut.
Alder,					Barley,				
Beech,					Bare or Bigg,				
Birch,					Oats,				
Blm,					Wheat,				
Larch,					Beans,				
Line,					Potatoes,				
Oak,					Tumpe,				
Sycamore or Plane,					Rye Grass,				
SHRUBS, ETC.	First in blossom.	First in blossom.	First in blossom.	First in blossom.	First in blossom.	First in blossom.	First in blossom.	First in blossom.	First in blossom.
Barberry,					Apple,				
Broom,					Black Currant,				
Hazel,					Cherry,				
Hawthorn,					Gooseberry,				
Holly,					Peach,				
Laburnum,					Plum,				
Mezereum,					Strawberry,				
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.

EDINBURGH.

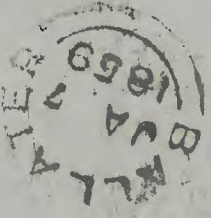
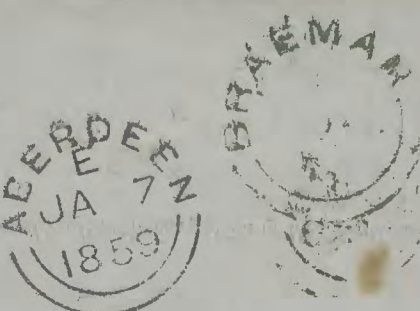
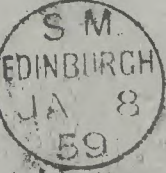
21, Rutland Street,

Sec., Meteorological Society,

DR STARK,

To

METEOROLOGICAL RETURNS.



DECEMBER 1858

See

Dr. Stark