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SCOTTISH METEOROLOGICAL SOCIETY.

Observations taken at Aberdeen, County of Aberdeen, in Lat. 57° 9′ N, Long. 2° 6′ W, Height above mean level of Sea 115 feet.

Distance from Sea 15 miles. During the MONTH of January 1859.

Days of Month.	Barometer. 8h 45m A.M. Barometer.	Barometer. 8h 45m A.M. Attached Thermometer	Barometer. 8h 45m P.M. Barometer.	Barometer. 8h 45m P.M. Attached Thermometer	Self-Registering Thermometers. Protected. Highest in Air.	Self-Registering Thermometers. Protected. Lowest in Air.	Self-Registering Thermometers. Exposed. Max. Black bulb in Sun.	Self-Registering Thermometers. Exposed. Min. Black bulb during Night.	Hygrometer. 8h 45m P.M. Dry bulb.	Hygrometer. 8h 45m P.M. Wet bulb.	Wind. 8h 45m P.M. Direction.	Wind. 8h 45m P.M. Force	Wind. 8h 45m P.M. Direction.	Wind. 8h 45m P.M. Force	Rain. Days on which it fell.	Rain. Amount.	Cloud. 1 to 10	Sunshine. Hours.	Thermometers under Ground. 8h 45m A.M. 3 inches.	Thermometers under Ground. 8h 45m A.M. 12 inches.	Thermometers under Ground. 8h 45m A.M. 22 inches.	Temperature of Spring or Well.	Temperature of Sea.	Ozone. 0 to 10	Electricity.	General Remarks. As to occurrence of Thunder, Lightning, Storms, Hail, Meteors, Remarkable Depression or Elevation of Barometer, etc. Mention the hour at which these began and ended.	Days of Month.
	inches.	°	inches.	°	°	°	°	°	°	°					days.	inches.			°	°	°	°	°		°		
1	30.094	50	30.280	50	46	26			41	40																	1
2	30.574	49	30.378	51	44	33			42	40																	2
3	30.260	48	30.320	49	45	32			43	41.5																	3
4	30.410	49	30.504	50	50	36			45	43																	4
5	30.522	48	30.428	47	47	30			40	39.5																	5
6	30.260	45	30.344	41	30	28	4		35.5	35																	6
7	30.488	40	30.648	46	43	26			32.5	32																	7
8	30.658	41	30.520	38	34	21			27.5	29																	8
9	30.418	39	30.380	41	36	23			35.5	35																	9
10	30.174	43	29.926	48	47	30			47	39																	10
11	29.936	49	30.100	49	51	27			48	43																	11
12	30.140	48	30.406	46	49	38			44.5	40.5																	12
13	30.480	44	30.436	41	45	30			35	32																	13
14	30.306	37	30.197	40	37	20			26	25.5																	14
15	30.090	37	29.726	43	35	21			29																		15
16	29.578	44	29.606	42	44	23			41.5	39																	16
17	29.354	41	29.206	46	43	32			37	35.5																	17
18	28.986	50	29.146	44	52	31			51.5	49																	18
19	29.482	45	29.850	45	53	31			36	34																	19
20	29.636	44			42	28			42	40																	20
21	29.750	48	29.484	46	49	34			38.5	37.5																	21
22	29.588	57	29.474	44	48	32			42.5	40.5																	22
23	28.834	43	28.970	43	44	29			41	40																	23
24	29.192	42	29.362	45	44	30			37	35																	24
25	29.192	46	28.954	43	48	31			47	43																	25
26	29.004	42	29.100	40	49	28			34	33																	26
27	29.180	39	29.320	42	36	28			34	32.5																	27
28	29.456	40	29.374	43	38	27			36.5	33																	28
29	29.308	43	28.784	43	40	31			39.5	38																	29
30	29.076	43	29.018	40	44	29			35.5	33.5																	30
31	29.032	38	29.404	43	37	27			33	32.5																	31
Sums.	923.398	1366	893.645	1329	1360	892			1198	1111																	
	29.787	44.1	29.788	44.3	43.9	28.8			38.6	37.0																	
Diurnal Range.‡	-.018		-.018																								
Corrected Means.	29.769		29.770																								
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.), ... = 29.769 Column No. 3 (P.M.), ... = 29.770 Barometer, Highest observed reading of Month, ... = 30.658 on the 8th

Diameter of tube ____ inch; correction for capillarity* to be added, ... + ____ Capillarity,* ..... = + ____ Lowest do. do., ... = 28.784 on the 29th

Sum, ... Sum, ... Difference, or Monthly Range, ... = 1.874

Correction for Temperature from Column No. 2 to be deducted, ... = − .041 Temp. from Col. 4, ... = − .041

Sum, ... 29.728 Sum, ... 29.729

Mean of the above 29.728

Correction for Height above Sea-level, 115 feet, to add, ... .433

Barometer corrected and reduced to 32° and Sea-level, ... 29.861 .861

Summary of the Winds.	N	NE	E	SE	S	SW	W	NW	Calm or Variable.	Mean Force.
A.M.										
P.M.										

Dry bulb Thermometer (mean of Cols. 9 and 11),* 38.6

Wet bulb Thermometer (mean of Cols. 10 and 12),* 37.0

† Dew-point Temperature, ... 34.8

† Elastic Force of Vapour, ... .203

† Weight of Vapour in a Cubic Foot of Air, ... 2.34

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

‡ Degree of Humidity (Saturation 100), ... 87

Highest Reading Self-Registering Thermometer in Air and Protected, ... 53.0 on the 19th

Lowest do. do. do., ... 20.0 on the 14th

Difference, being Monthly Range, ... 33.0

Mean of Self-Registering Thermometers in Air and Protected, ... 36.4

Mean Daily Range in Air and Protected, ... 15.1

Greatest Daily Range, do., ... 24

Highest Reading Self-Registering Black Bulb Thermometer in Sun, ... on the

Lowest do. do. from Radiation during Night, ... on the

(Signed) Thomas David Gray

(Designation) Student

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

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

* Correction for Index error and Capillarity in one sum

INSTRUCTIONS FOR MAKING METEOROLOGICAL OBSERVATIONS.

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

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

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

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

The corrections necessary to be applied to the Barometric readings depend on the form of the instrument. The daily readings 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 Hygrometer.—These should be placed alongside of each other, in a place freely exposed to the air, but protected from sunshine, and from reflected heat, as well as from radiation and from rain, 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 louvre-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 louvre-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 added 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, so that readings should be *always be read on the evenings*, so that the maximum and the minimum of the day by the floats indicate the minimum and the maximum of the day on which the reading is taken. N.B.—The readings of these instruments are taken from that extremity of the float which is nearest the *head of the column* of mercury or of spirit.

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

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

Hygrometer.—The *wet* bulb requires to be kept moistened. In towns once a month, or oftener, if the weather is dusty, and the muslin gets foul; in the country whenever the muslin seems to be foul. The bulb should be covered with thin tissue or blotting paper below the muslin, and the muslin should always be thoroughly wetted, and freed from starch, before being used; and the cotton wick which conducts moisture to it should be previously soaked in a solution of washing soda, and then in pure water, before being attached, in order that it may be thoroughly wetted, else it will conduct the moisture imperfectly, and yield false results. In frosty weather, water must be poured over the wet bulb, so as to form a thin film of ice on the muslin, the evaporation from the ice going on as from the simply wetted bulb.

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

Winds.—Isolated Wind-vanes or Weather-cocks are apt to give false indications of the general direction of the wind, in consequence of the currents of air at the surface of the ground being so much influenced by the neighbourhood of hills, valleys, buildings, etc. Where low clouds are seen drifting along, their direction in reference to known objects, or as noted by means of a mirror on which a compass may be laid, or by means of a circular mirror fixed over the centre of a pocket compass, will, in general, give the true direction of the current of air near the earth's surface if these clouds are near and immediately over head, that is, in or near the zenith of the observer. The motion of the higher strata of clouds gives no such indication. Failing the clouds, the general direction of the smoke of a 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 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 sunshine, so that the indications noted in the column for clouds would not necessarily express, or agree with, the column for sunshine. As the full moon, *so long as it is above the horizon*, is thought by some eminent astronomers to have a powerful effect in dispelling clouds, it would be well to note in the General Remarks any facts bearing on this point, for a few days (or nights, as the case may be) before and after every full moon; and the same observations ought to be made at the periods of new moon.

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

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

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

Gauge.—Mention whether Schonbein's or Moffat's scale and papers are used. Schonbein's are preferred. They may be had at Messrs Adie and Son's, 50, Princes Street, and at Mr Bryson's, 50, 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. 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.	Divested of Leaves.	CROPS, mentioning variety.	Sowing or Planting.	Appearing above Ground.	In Ear or Flower.	First Cut or Raised.
Alder,					Barley,				
Ash,					Bere or Bigg,				
Beech,					Oats,				
Birch,					Wheat,				
Elm,					Beans,				
Larch,					Pease,				
Lime,					Potatoes,				
Oak,					Turnips,				
Sycamore or Plane,					Rye Grass,				

SHRUBS, ETC.	First in Blossom.	FRUITS.	First in Blossom.	Fruit Ripe generally.	MIGRATORY BIRDS.	First Arrival.	Departure.
Barberry,		Apple,			Cuckoo,		
Bourtree or Elder,		Black Currant,			Curlew,		
Broom,		Cherry,			House-Swallow,		
Hazel,		Gean,			Lapwing,		
Hawthorn,		Gooseberry,			Plover,		
Holly,		Peach,			Sand-Martin,		
Laburnum,		Pear,			Starling,		
Lilac,		Plum,			Swan,		
Mezereon,		Strawberry,			Rail or Corn Crake,		
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.

METEOROLOGICAL RETURNS.

To

DR STARK,

Sec., Meteorological Society,

21, Rutland Street,

EDINBURGH.

Jan

Aberdeen

Joseph David Everett Esq.
10 St. Andrew Square
Edinburgh

S M EDINBURGH FE 3 59

FEB 22 1859

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SCOTTISH METEOROLOGICAL SOCIETY.

Observations taken at Aberdeen, County of Aberdeen, in Lat. 57°9'N, Long. 2°6'W, Height above Sea 115 feet.

Distance from Sea 2 miles. During the MONTH of January 1859.

Days of Month	BAROMETER. ___h. A.M. Barometer. (inches.)	Attached Thermometer (°)	___h. P.M. Barometer. (inches.)	Attached Thermometer (°)	SELF-REGISTERING THERMOMETERS. PROTECTED. Highest in Air. (°)	Lowest in Air. (°)	EXPOSED. Max. Black bulb in Sun. (°)	Min. Black bulb during Night. (°)	HYGROMETER. ___h. A.M. Dry bulb. (°)	Wet bulb. (°)	___h. P.M. Dry bulb. (°)	Wet bulb. (°)
1												
2												
3												
4												
5												
6												
7												
8												
9												
10												
11												
12												
13												
14												
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19												
20												
21												
22												
23												
24												
25												
26												
27												
28												
29												
30												
31												
Sums.												
Means.												
Index Errors.												
Correction for Diurnal Range.‡												
Corrected Means.												
No. of Column.	1	2	3	4	5	6	7	8	9	10	11	12

Days of Month	WIND. ___h. A.M. Direction.	Force (††)	___h. P.M. Direction.	Force (††)	RAIN. Days on which it fell. (days.)	Amount. (inches.)	CLOUD. 1 to 10	SUNSHINE. Hours.	THERMOMETERS. under Ground. ___h. A.M. 3 inches. (°)	12 inches. (°)	22 inches. (°)	Temperature of SPRING or WELL. (°)	SEA. Temperature. (°)	Density.	OZONE. 0 to 10 A.M.	P.M.	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.*
1																		
2	SW	1	W	0.25	0		3	0				45						
3	W	0.25	SW	0.25	0		7	1				45						
4	var	0.25	W	2.25	0		8	2				45						
5	W	0.25	var	0.25	0		2	6				45						
6	W	0.25	W	0.25	0		5	4				45						
7	var	0.25	NW	4	1		8	2				45						
8	N	4	N	4	0		8	2				45.5						snow showers
9	SW	0.25	W	0.25	0		7	2				45.5						
10	SW	0.25	W	0.25	1		9	0				45.5						
11	NW	9	W	9	0		8	0				45.5						aurora box found diffused
12	NW	4	NW	4	0		3	5				45.5						
13	NW	4	N	4	1		8	0				45.5						
14	N	2.25	NW	1	0		8	0				44						
15	W	0.25	W	0.25	0		7	3				44						solar halo
16	SW	2.25	SW	4	1		8	0				44						
17	SW	9	SW	4	0		4	5				44						lunar halo
18	SW	2.25	SW	1	1		1	6				44						lunar halo
19	SW	4	SW	2.25	1		1	6				44						
20	SW	2.25	SW	0.25	0		3	6				44						
21	SW	9	SW	9	1		9	0				44						
22	var	0.25	var	1	1		7	3				44						
23	SW	2.25	SW	4	0		4	3				44						
24	SW	2.25	var	1	1		9	0				44						sleet showers
25	NW	2.25	SW	1	1		8	2				44						
26	SW	4	SW	0.25	1		7	5				44						a little sleet
27	W	1	W	0.25	0		8	2				43.5						snow showers, silent lightning night
28	W	0.25	W	0.25	0		4	6				43.5						aurora bor. arch
29	W	0.25	SW	0.25	1		7	5				43.5						solar halo, dark first sing
30	SW	0.25	S	9	1		7	2				43.5						2 mock suns, silent lightning night
31	SW	0.25	SW	0.25	0		5	6				43						solar halo, 2 mock suns
Sums.		68.25		68.0	14	0.90	189	90				1375 / 135.0						
Means.		2.20		2.2	0.81		6.1					44.3						
Index Errors.																		
Correction for Diurnal Range.‡																		
Corrected Means.																		
No. of Column.	13	14	15	16	17	18	19	20	21	22	23	24	25	26			27	

The directions of Wind given are the mean of prevailing directions for each 12 hours by frequent inspections of wind vane. The forces given are the mean forces for each 12 hrs

0.90 Rain

* Wm & Smith W Hemhill 3 miles SW of centre of Aberdeen

† Balmoral Place 1 mile SW of centre of Aberdeen

‡ Wm & D Milne Rubislaw Works ½ mile W of centre of Aberdeen

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

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

Sum,..... Sum,..... Difference, or Monthly Range,.....=

Correction for Temperature from Column No. 2 to be deducted,.....=− Temp. from Col. 4,.....=−

Sum,..... Sum,.....

Mean of the above .....

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

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

SUMMARY OF THE WINDS.

Direction.	N	NE	E	SE	S	SW	W	NW	Calm or Variable.	Mean Force.	Mean Velocity in miles per day.
A.M.	2	0	0	0	0	15	7	4	3	2.2	
P.M.	2	0	0	0	1	12	10	3	3	2.2	
Mean.	~~2~~ 2	~~0~~ 0	~~0~~ 0	~~0~~ 0	~~1~~ ½	~~13½~~ 13½	~~8½~~ 8½	~~3½~~ 3½	~~3~~ 3	~~2.2~~ 2.2	

Mean 2.2

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

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

† Dew-point Temperature,.....

† Elastic Force of Vapour,.....

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

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

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

Highest Reading Self-Registering Thermometer in Air and Protected, ... on the

do. do. do., ... on the

...nce, being Monthly Range,.....

...f Self-Registering Thermometers in Air and Protected, ...

...Daily Range in Air and Protected, ...

...t Daily Range, do., ... on the

...Reading Self-Registering Black Bulb Thermometer in Sun, ... on the

Lowest do. do. from Radiation during Night, on the

†† In the above columns for the registration of the Force of the Wind, may be entered the *number of revolutions*, by Professor Robinson's Cup Wind Gauge, which registers the velocity of the Wind—540 revolutions being equal to one statute mile.

* If the readings are taken at 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.

(*Signed*) Alexr Bruckshank A.M.

(*Designation*) 12 Rose Street Aberdeen

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.*

Force of Wind estimated approximately on scale of 0–6 or 0–36 lbs on square foot

Both Rain Gages are of the form a tube of 3 inches diam on top of a tube of 1 inch diam. The quantity of rain is measured by a graduated slip of whalebone as a dipper. This gage was adopted by the late Mr Stratton Aberdeen as the best form of gage after numerous experiments on all sorts of forms. The Hemhill gage has its top 5 feet above ground—a height (2 ft) adopted by Mr S as the best. It has been found necessary to have the top of the Balmoral Place gage 5 feet above the surface of ground from local circumstances

January
Aberdeen

To

DR STARK,

Sec., Meteorological Society,

21, Rutland Street,

EDINBURGH.

ABERDEEN
FEB 22
1859
D

METEOROLOGICAL RETURNS.

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EDINBURGH
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59

INSTRUCTIONS FOR MAKING METEOROLOGICAL OBSERVATIONS.

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

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

Barometer.—Barometers of Messrs Adie and Son's construction are recommended; but any instruments may be used which have adjustable surfaces, and have been compared.

Before this instrument is suspended for use it should be examined, in order to ascertain whether the space above the mercury is free from air. This is done by inclining the instrument somewhat from the vertical position, when, if free from air, the mercury will strike against the upper end of the tube with a sharp tap. The mercury should then completely fill the tube. If any air has got admittance, it should be driven into the cistern by reversing the instrument, and tapping it gently with the hand. If it cannot be thus expelled, the instrument is useless till repaired.

The Barometer should be hung in a good light, and perfectly perpendicular, as ascertained by the plumb-line. The observer should always 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. In reading off 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 are to be entered on the Schedule as *read off*, and the corrections only applied to the mean for the month.

Self-Registering Thermometers and Hygrometer.—These should be placed alongside of each other, in a place freely exposed to the air, but protected from sunshine, and from reflected heat, as well as from radiation and from rain, and as 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 louvre-board sides, fixed in an exposed place, and if possible over grass. Whatever means are finally adopted, the position of the instruments should be carefully noted, 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 nearly horizontal, in the case of the *maximum* Thermometer, with clay, glass, or steel index, the bulb may be *very slightly* elevated in order that the index may fall by its own weight, and by the force of gravity in pushing forward the index, and in the case of the *minimum* Thermometer, the bulb must be slightly depressed, to prevent a draining of the spirit to the top of the tube, and also that any part raised in vapour may return to the column. These Thermometers, if read once a-day, should *always be read on the evenings*, so that the temperatures marked by the floats indicate the minimum and the maximum of the day on which the reading is taken. N.B.—The readings of these instruments are taken from that extremity of the float which is nearest the *head of the column* of mercury or of spirit.

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

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

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

Rain Gauge.—As "Fleming's Rain Gauges" seem to possess several advantages over others, the Society gives the preference to them; but whatever form be employed, in order that all the stations may yield comparable results, it is recommended that the Gauge be sunk in the ground, so that the top of the receiver is nearly on a level with the top blades of *close cut grass*, in a place as distant as possible from trees, houses, high walls, and 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 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 the vane. The observer should state whether he has ascertained the direction of the wind by reflection or otherwise. For mode of estimating the force of the wind, see "Directions for Reading Instruments." Lind's Anemometer is commonly used for this purpose, but the best Anemometer of moderate price yet invented is Professor Robinson's Cup Wind Gauge, which registers the velocity of the wind,—540 revolutions of the cups, as registered by the instrument, being equal to one statute mile.

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

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

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

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

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

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 and their indications should be alone noted—always the same plant from year to year being noticed.

Ozone.—Mention whether Schonbein's or Moffat's scale and papers are used. Schonbein's are preferred. They may be had at Messrs Adie and Son's, 50, 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. 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.	Diversed of Leaves.	CROPS, mentioning variety.	Sowing or Planting.	Appearing above Ground.	In Ear or Flower.	First Cut or Raised.
Alder,					Barley,				
Ash,					Bere or Bigg,				
Beech,					Oats,				
Birch,					Wheat,				
Elm,					Beans,				
Larch,					Pease,				
Lime,					Potatoes,				
Oak,					Turnips,				
Sycamore or Plane,					Rye Grass,				

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

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

SCOTTISH METEOROLOGICAL SOCIETY.

Observations taken at Aberdeen, County of Aberdeen, in Lat. 57°.9'N., Long. 2°.6'W., Height above mean level of Sea 115 feet.

Distance from Sea 1½ miles. During the MONTH of February 1859.

Days of Week.	Days of Month.	Barometer. 8h.45 A.M. Barometer.	Barometer. 8h.45 A.M. Attached Thermometer	Barometer. 9h. P.M. Barometer.	Barometer. 9h. P.M. Attached Thermometer	Self-Registering Thermometers. Protected. Highest in Air.	Self-Registering Thermometers. Protected. Lowest in Air.	Self-Registering Thermometers. Exposed. Max. Black bulb in Sun.	Self-Registering Thermometers. Exposed. Min. Black bulb during Night.	Hygrometer. ___h. A.M. Dry bulb.	Hygrometer. ___h. A.M. Wet bulb.	Hygrometer. ___h. P.M. Dry bulb.	Hygrometer. ___h. P.M. Wet bulb.	Wind. ___h. A.M. Direction.	Wind. ___h. A.M. Force	Wind. ___h. P.M. Direction.	Wind. ___h. P.M. Force	Rain. Days on which it fell.	Rain. Amount.	Cloud. 1 to 10	Sunshine. Hours.	Thermometers under Ground. ___h. A.M. 3 inches.	Thermometers under Ground. ___h. A.M. 12 inches.	Thermometers under Ground. ___h. A.M. 22 inches.	Temperature of Spring or Well.	Temperature of Sea.	Ozone. 0 to 10	Electricity.	General Remarks, As to occurrence of Thunder, Lightning, Storms, Hail, Meteors, Remarkable Depression or Elevation of Barometer, etc. Mention the hour at which these began and ended.	Days of Month.
		inches.	°	inches.	°	°	°	°	°	°	°	°	°					days.	inches.			°	°	°	°	°		°		
	1	29.636	42	29.064	42	39	28.5			35.5	34																			1
	2	28.994	42	29.630	41	40	31			37.5	35																			2
	3	29.916	38	29.740	37	42	26			32.5	32																			3
	4	29.476	41	29.176	42	42	28			41.5	40																			4
	5	29.128	40			47	31			37.5	37																			5
	6	29.164	42	29.100	40	41	29			38	37.5																			6
	7	29.142	39	29.204	40	40	27			33	32.5																			7
	8	29.358	38	29.340	44	40	23			30.5																				8
	9	29.274	44	29.030	45	43	26			42.5	40.5																			9
	10	29.150	44	29.204	44	43	32			39.5	38																			10
	11	29.274	43	29.414		42	33			40	39.5																			11
	12	29.568	47	29.878	48	44	35			39.5	39																			12
	13	29.818	46	29.764	47	44	31			39.5	39																			13
	14	29.648	46	29.770	43	43	32			40.5	40																			14
	15	29.468	43			44	29			43.5	42.5																			15
	16	29.470	49	29.632	48	54	38			43	42.5																			16
	17	29.668	45	29.650	45	47	32			38	34																			17
	18	29.820	45	30.154	45	44	29			35.5	34																			18
	19	30.180	42	30.074	47	40	29			36	33.5																			19
	20	30.080	49	29.976	49	45	32			44.5	42.5																			20
	21	29.928	48	29.976	50	50	37			44	41.5																			21
	22	29.802	46	30.336	46	50	35			44	41																			22
	23	30.392	47	30.166	56	46	30			42	38																			23
	24	30.124	53	30.028	54	52	37			52	47.5																			24
	25	29.994	54	29.722	53	54	33			48																				25
	26	29.410	50	29.452	50	51	40			45	43																			26
	27	29.880	51	30.142	50	47	35			42	39																			27
	28	30.032	45	29.770	47	46	28			38	37																			28
	29																													29
	30																													30
	31																													31
Sums.		829.799	1259	771.992	1153	1260	876.5			1123	1000																			
Means.		29.635	45.0	29.668	46.1	45.0	31.3			40.1	38.5 ~~35.7~~																			
Index ~~Error~~ Correction		*-.018		-.018																										
Correction for Diurnal Range.‡																														
Corrected Means.		29.617		29.650																										
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.), = 29.617 Column No. 3 (P.M.), = 29.650 Barometer, Highest observed reading of Month, = 30.392 on the 23rd

Diameter of tube ___ inch; correction for capillarity* to be added, + .000 Capillarity,* = + Lowest do. do., = 28.994 on the 2nd

Sum, Sum, Difference, or Monthly Range, = 1.398

Correction for Temperature from Column No. 2 to be deducted, = − .044 Temp. from Col. 4, = − .046

Sum, 29.573 Sum, 29.604

Mean of the above 29.588

Correction for Height above Sea-level, ___ feet, to add, .133

Barometer corrected and reduced to 32° and Sea-level, 29.721

Summary of the Winds. Direction.	N	NE	E	SE	S	SW	W	NW	Calm or Variable.	Mean Force.
A.M.										
P.M.										

Dry bulb Thermometer (mean of Cols. 9 and 11),* 40.1 ~~40.1~~

Wet bulb Thermometer (mean of Cols. 10 and 12),* 38.5 ~~35.7~~

† Dew-point Temperature, 36.5 ~~30.0~~

† Elastic Force of Vapour, .215.5

† Weight of Vapour in a Cubic Foot of Air, 2.49

† Additional Weight required to Saturate a Cubic Foot,

† Degree of Humidity (Saturation 100), 87

Highest Reading Self-Registering Thermometer in Air and Protected, 54.0 on the 16th

Lowest do. do. do., 23.0 on the 8th

Difference, being Monthly Range, 31.0

Mean of Self-Registering Thermometers in Air and Protected, 38.2

Mean Daily Range in Air and Protected, 13.5

Greatest Daily Range, do., 21.0 on the 28th

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

Lowest do. do. from Radiation during Night, on the

(Signed) Thomas David Gray

(Designation) Student

* 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.

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* Correction for index error and capillarity in one sum

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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.

Ozone.—Mention whether Schonbein's or Moffat's scale and papers are used. Schonbein's are preferred. They may be had at Messrs Adie and Son's, 50, 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. 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.	Divested of Leaves.	CROPS, mentioning variety.	Sowing or Planting.	Appearing above Ground.	In Ear or Flower.	First Cut or Raised.
Alder,					Barley,				
Ash,					Bere or Bigg,				
Beech,					Oats,				
Birch,					Wheat,				
Elm,					Beans,				
Larch,					Pease,				
Lime,					Potatoes,				
Oak,					Turnips,				
Sycamore or Plane,					Rye Grass,				

SHRUBS, ETC.	First in Blossom.	FRUITS.	First in Blossom.	Fruit Ripe generally.	MIGRATORY BIRDS.	First Arrival.	Departure.
Barberry,		Apple,			Cuckoo,		
Bourtree or Elder,		Black Currant,			Curlew,		
Broom,		Cherry,			House-Swallow,		
Hazel,		Gean,			Lapwing,		
Hawthorn,		Gooseberry,			Plover,		
Holly,		Peach,			Sand-Martin,		
Laburnum,		Pear,			Starling,		
Lilac,		Plum,			Swan,		
Mezereon,		Strawberry,			Rail or Corn Crake,		
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.

T M
CAMBRIDGE
MR 4
59

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EDINBURGH
MR 20
69

Alex. G. Keith
Secy Meteorological Soc'ty
21, Rutland Square
Edinburgh

METEOROLOGICAL RETURNS.

102

SCOTTISH METEOROLOGICAL SOCIETY.

Observations taken at Aberdeen, County of Aberdeen, in Lat. 57° 9'N, Long. 2° 6'W, Height above Sea 115 feet.

Distance from Sea 2 miles. During the MONTH of February 1859.

Phasis of Moon.	Days of Month.	BAROMETER. ___h. A.M. Barometer. (inches.)	Attached Thermometer (°)	___h. P.M. Barometer. (inches.)	Attached Thermometer (°)	SELF-REGISTERING THERMOMETERS. Protected. Highest in Air. (°)	Lowest in Air. (°)	Exposed. Max. Black bulb in Sun. (°)	Min. Black bulb during Night. (°)	HYGROMETER. ___h. A.M. Dry bulb. (°)	Wet bulb. (°)	___h. P.M. Dry bulb. (°)	Wet bulb. (°)	WIND. ___h. A.M. Direction.	Force ††	___h. P.M. Direction.	Force ††	RAIN. Days on which it fell. (days.)	Amount. (inches.)	CLOUD. 1 to 10	SUNSHINE. Hours.	THERMOMETERS. under Ground. ___h. A.M. 3 inches. (°)	12 inches. (°)	22 inches. (°)	Temperature of SPRING or WELL. (°)	SEA. Temperature. (°)	Density.	OZONE. 0 to 10 A.M.	P.M.	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.
	1													SW	0.25	SW	4	1		7	4				43						Solar Halo. Aurora borealis A little sleet	1
	2													NW	4	N	9	1		8	1				43						Solar Halo. 2 Mock Suns Showers of snow	2
	3													SW	1	SW	0.25	0		8	2				43						Solar Halo and 2 Mock suns.	3
	4													SW	2.25	SW	~~2.25~~ 4	1		9	2				43							4
	5													SW	1	SW	2.25	0		8	0				43							5
	6													SE	0.25	NW	0.25	1		10	0				43						Sleet showers	6
	7													S	0.25	SW	2.25	0		9	0				43							7
	8													SW	1	S	4	0		5	6				43							8
	9													S	4	S	4	1		10	0				43							9
	10													S	2.25	S	~~0.25~~ 4	1		8	3				43							10
	11													S	0.25	S	0.25	1		9	1				43							11
	12													Var	0.25	Var	0.25	0		8	4				43							12
	13													SW	0.25	SW	0.25	0		6	5				43						Lunar Halo	13
	14													SW	0.25	Var	0.25	1		9	0				43							14
	15													SW	4	W	0.25	0		6	6				43							15
	16													SW	0.25	NW	0.25	1		10	0				43						Thunder	16
	17													SW	0.25	NW	2.25	1		5	7				42.5						Thunder	17
	18													NW	2.25	W	0.25	0		3	7				42.5						Showers of snow.	18
	19													SW	0.25	SW	0.25	1		9	0				42.5						Thunder	19
	20													SW	0.25	SW	0.25	0		6	6				42.5							20
	21													SW	4	SW	4	1		7	4				42.5							21
	22													SW	0.25	NW	2.25	1		7	3				42.5						A little sleet. Aurora borealis.	22
	23													W	2.25	W	4	0		8	3				42.5						Aurora borealis	23
	24													W	0.25	W	0.25	0		9	2				42.5							24
	25													W	0.25	W	0.25	1		10	0				42.5						Aurora borealis	25
	26													W	2.25	NW	0.25	1		9	0				42.5						Aurora borealis	26
	27													NW	9	NW	4	1		3	7				42.5							27
	28													SW	4	SW	9	1		8	2				42.5						Silent lightning night.	28
	29																																29
	30																																30
	31																																31
Sums.															46.75		62.5	17	1.61	216	75				1198							
Means.															1.6		2.2		In A.A. Smith West Kew Hill 3 miles West of Aberdeen.	7.7	2.7				42.8 ~~43.5~~							
Index Errors.																			1.20 One mile Southwest of Aberdeen.						St Helena Rubislaw Industry Aberdeen							
Correction for Diurnal Range.‡																																
Corrected Means.																																
No. of Column.		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25		26		27		

Barometer, mean corrected reading of Column No. 1 (A.M.),.....= _____ Column No. 3 (P.M.),.....= _____ Barometer, Highest observed reading of Month,.....= _____ on the _____

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

Sum,..... _____ Sum,..... _____ Difference, or Monthly Range,.....= _____

Correction for Temperature from Column No. 2 to be deducted,.....= — _____ Temp. from Col. 4,.....= — _____

Sum,..... _____ Sum,..... _____

Mean of the above ..... _____

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

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

SUMMARY OF THE WINDS.

Direction.	N	NE	E	SE	S	SW	W	NW	Calm or Variable.	Mean Force.	Mean Velocity in miles per day.
A.M.	0	0	0	1	4	15	4	3	1	1.6	
P.M.	1	0	0	0	4	10	5	6	2	2.2	
Mean.	1	0	0	~~1~~	4	12 ~~1~~ 5	4 ~~1~~	2 ~~1~~		1.9	

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

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

† Dew-point Temperature,..... _____

† Elastic Force of Vapour,..... _____

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

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

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

Highest Reading Self-Registering Thermometer in Air and Protected, ... _____ on the _____

Lowest do. do. do., ... _____ on the _____

Difference, being Monthly Range,..... _____

Mean of Self-Registering Thermometers in Air and Protected, ... _____

Mean Daily Range in Air and Protected, ... _____

Greatest Daily Range, do., ... _____ on the _____

Highest Reading Self-Registering Black Bulb Thermometer in Sun, ... _____ on the _____

Lowest do. do. from Radiation during Night, _____ on the _____

†† In the above columns for the registration of the Force of the Wind, may be entered the *number of revolutions*, by Professor Robinson's Cup Wind Gauge, which registers the velocity of the Wind—540 revolutions being equal to one statute mile.

* If the readings are taken at 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.

(*Signed*) Alex^r Cruickshank M.A.

(*Designation*) 12 Rose St Aberdeen

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

INSTRUCTIONS FOR MAKING METEOROLOGICAL OBSERVATIONS.

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

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

Barometer.—Barometers of Messrs Adie and Son's construction are recommended; but any instruments may be used which have adjustable surfaces, and have been compared. Before this instrument is suspended for use it should be examined, in order to ascertain whether the space above the mercury is free from air. This is done by inclining the instrument somewhat from its ordinary 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 Hygrometer.—These should be placed alongside of each other, in a place freely exposed to the air, but protected from sunshine, and from reflected heat, as well as from radiation and from rain, and as 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 louvre-boarded sides, fixed at a north window, or in a double ventilated box with louvre-boarded sides, fixed in a free current of air to pass between the box and the wall; or in a double-ventilated box with louvre-boarded sides, fixed in a double-ventilated box 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 somewhat elevated, in order that the mercurial column may be forward the float or aided by the force of gravity in pushing forward the float or index; and in the case of the *minimum* Thermometer, for taking the extreme heat of the sun's rays, should have its bulb blackened and must be slightly depressed, to prevent a draining of the spirit to the top of the tube, and also that any part raised in vapour may return to the column. These Thermometers, if read once a-day, should *always be read on the evenings*, so that the temperatures marked by the floats indicate the minimum and the maximum of the day on which the reading is taken. N.B.—The readings of these instruments are taken from that extremity of the float which is nearest the *head of the column* of mercury or of spirit.

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

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

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

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

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

Clouds.—The Society recommends observers to adopt the Howard nomenclature of clouds. The scale of cloud in the visible sky is reckoned from 0 to 10. Thus, a sky quite free from cloud is 0; a sky half covered with cloud is 5; and the whole visible sky covered with cloud is 10. Clouds often cover three-fourths or even more of the visible sky without obstructing the sunshine, so that the indications noted in the column for clouds would not necessarily express, or agree with, the column for sunshine. As the full moon, *so long as it is above the horizon*, is 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 pitcher, covered with a sloping lid, and with a weight attached, is sunk to the required depth, and in ten minutes drawn up and read. The density of the sea water should, if possible, be taken at the same time. Convenient instruments are furnished by Messrs Adie and Son.

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

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.

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OBSERVATIONS IN CONNECTION WITH THE PERIODICAL RETURN OF THE SEASONS.

FOREST TREES.	In Flower.	Leaf Buds first appear.	In Leaf.	Divested of Leaves.	CROPS, mentioning variety.	Sowing or Planting.	Appearing above Ground.	In Ear or Flower.	First Cut or Raised.
Alder,	Feb. 28.				Barley,				
Ash,					Bere or Bigg,				
Beech,					Oats,				
Birch,					Wheat, Spring	Feb. 26.			
Elm,					Beans,				
Larch,					Pease,				
Lime,					Potatoes,	Feb. 26.			
Oak,					Turnips,				
Sycamore or Plane,					Rye Grass,				

SHRUBS, ETC.	First in Blossom.	FRUITS.	First in Blossom.	Fruit Ripe generally.	MIGRATORY BIRDS.	First Arrival.	Departure.
Barberry,		Apple,			Cuckoo,		
Bourtree or Elder,		Black Currant,			Curlew,		
Broom,		Cherry,			House-Swallow,		
Hazel,	Feb. 19.	Gean,			Lapwing,		
Hawthorn,		Gooseberry,			Plover,		
Holly,		Peach,			Sand-Martin,		
Laburnum,		Pear,			Starling,		
Lilac,		Plum,			Swan,		
Mezereon,	Feb. 17th	Strawberry,			Rail or Corn Crake,		
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.

Feb. 1. Snow drop just in flower
Feb. 5. Draba Aizoa just in flower
" Hepatica just " "
Feb. 15. Japonica " " "
Feb. 22. Crocus " " "

Aberdeen
Feb 9

To
DR STARK,
Sec., Meteorological Society,
21, Rutland Street,
EDINBURGH.

METEOROLOGICAL RETURNS.

POSTAGE

EDINBURGH MR 9 59

164

130

105

SCOTTISH METEOROLOGICAL SOCIETY.

Observations taken at Aberdeen, County of Aberdeen, in Lat. 57°.9 N., Long. 2°.6 W., Height above Sea mean level of 115 feet.

Distance from Sea 1½ miles. During the MONTH of March 1859.

Days of Month.	Barometer. 8.45 m. A.M. Barometer.	Attached Thermometer.	Barometer. 9 h. P.M. Barometer.	Attached Thermometer.	Self-Registering Thermometers. Protected. Highest in Air.	Lowest in Air.	Exposed. Max. Black bulb in Sun.	Min. Black bulb during Night.	Hygrometer. 8.45 m. A.M. Dry bulb.	Wet bulb.	h. P.M. Dry bulb.	Wet bulb.	Wind. h. A.M. Direction.	Force.	h. P.M. Direction.	Force.	Rain. Days on which it fell.	Amount.	Cloud. 1 to 10	Sunshine. Hours.	Thermometers under Ground. h. A.M. 3 inches.	12 inches.	22 inches.	Temperature of STRING or WELL.	Temperature of SEA.	Ozone. 0 to 10	Electricity.	General Remarks. As to occurrence of Thunder, Lightning, Storms, Hail, Meteors, Remarkable Depression or Elevation of Barometer, etc. Mention the hour at which these began and ended.	Days of Month.
	inches.	°	inches.	°	°	°	°	°	°	°	°	°					days.	inches.			°	°	°	°	°		°		
1	29.802	47	30.044	49	45	31			43.5	38																			1
2	29.964	48	29.758	49	48	35			42	41																			2
3	29.804	49	29.890	56	48	37			45	44																			3
4	29.850	55		57	62	41			51	47																			4
5	29.900	59	29.950	57	61	42			54	52																			5
6	30.072	54	29.884	52	55	36			45	40.5																			6
7	29.216	52	29.024	52	50	40			50	46																			7
8	29.182	51	29.860	42	49	30			36.5	33																			8
9	30.138	44	30.000	45	40	26			33	32																			9
10	30.020	47	29.784	49	43	28			43	41																			10
11	29.342	48	29.066	51	49	38			43	42.5																			11
12	29.174	52	29.152	51	50	35			42	37.5																			12
13	29.166	52	29.408	52	48	34			41.5	39																			13
14	29.608	52	29.330	48	48	28			37	35																			14
15	29.144	47	29.476	45	46	29			37	36.5																			15
16	29.448	45	29.262	51	40	27			40	38.5																			16
17	29.064	51	29.134	47	49	36			48	46																			17
18	29.206		29.860	48	50	31			43	39.5																			18
19	29.990	47	29.980	50	46	28			38.5	36.5																			19
20	29.754	49	29.474	49	50	33			45.5	43																			20
21	29.756	52	30.092		52	31			39.5	35.5																			21
22	30.116	48	30.006	50	41	28			40	36																			22
23	29.988	50	29.704	50	57	35			50	46																			23
24	29.942	52	29.858	48	55	38			42	41.5																			24
25	29.836	49	29.638	48	48	31			41	40																			25
26	29.550	55	29.642	52	51	35			49.5	44.5																			26
27	29.514	53	29.290	52	52	39			50.5	47																			27
28	29.180	50	29.068	48	54	37			43	40																			28
29	28.940	49	29.200	46	49	31			39	38.5																			29
30	29.416	47	29.750	45	41	28			36	32.5																			30
31	29.950	43	30.040	42	37	20.5			29	28.5																			31
Sums.	19.232	1497	18.354	1481	1508	1018.5			1318	1285																			
Means.	29.614	49.9	29.612	49.4	48.6	32.8			42.5	40.0																			
Correction for Index Errors.	-.018		-.018																										
Correction for Diurnal Range.‡																													
Corrected Means.	29.596		29.594																										
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.), ... = 29.596

Column No. 3 (P.M.), ... = 29.594

Barometer, Highest observed reading of Month, ... = 30.138 on the 4th

Diameter of tube ____ inch; ~~correction for capillarity to be added~~, ... + ____

Capillarity*, ... = + ~~.002~~

Lowest do. do., ... = 28.940 on the 29th

Sum, ... ____

Sum, ... ____

Difference, or Monthly Range, ... = 1.198

Correction for Temperature from Column No. 2 to be deducted, ... = -.057

Temp. from Col. 4, ... = -.055

Sum, ... 29.539

Sum, ... 29.539

Mean of the above 29.539

Correction for Height above Sea-level, ____ feet, to add, ... .133

Barometer corrected and reduced to 32° and Sea-level, ... 29.672

Summary of the Winds. Direction.	N	NE	E	SE	S	SW	W	NW	Calm or Variable.	Mean Force.
A.M.										
P.M.										

Dry bulb Thermometer (mean of Cols. 9 and ~~11~~),* 42.5

Wet bulb Thermometer (mean of Cols. 10 and ~~12~~),* 40.0

† Dew-point Temperature, ... 36.4

† Elastic Force of Vapour, ... .220

† Weight of Vapour in a Cubic Foot of Air, ... 2.55

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

† Degree of Humidity (Saturation 100), ... 81.5

Highest Reading Self-Registering Thermometer in Air and Protected, ... 62.0 on the 4th

Lowest do. do. do., ... 20.5 on the 31st

Difference, being Monthly Range, ... 41.5

Mean of Self-Registering Thermometers in Air and Protected, ... 40.7

Mean Daily Range in Air and Protected, ... 15.8

Greatest Daily Range, do., ... 21.0

Highest Reading Self-Registering Black Bulb Thermometer in Sun, ... on the

Lowest do. do. from Radiation during Night, ... on the

(Signed) Thomas David Gray

(Designation) Student

* If the readings are taken at 9h. and 3h., the 9h. readings to be alone taken to account, as the correction for Diurnal Range in Scotland is unknown.

† All these calculated from Glaisher's Hygrometric Tables, Second Edition *only*.

‡ The Diurnal Range for Scotland is as yet unknown.

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

* Correction for Index error and Capillarity in one Sum

INSTRUCTIONS FOR MAKING METEOROLOGICAL OBSERVATIONS.

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

Barometer.—Barometers of Messrs Adie and Son's construction are recommended; but any instruments may be used which have adjustable surfaces, and have been compared. Before this instrument is suspended for use it should be examined, in order to ascertain whether the space above the mercury is free from air. This is done by inclining the instrument somewhat from the vertical position, when, if free from air, the mercury will strike against the upper end of the tube with a sharp tap. The mercury should then completely fill the tube. If any air has got admittance, it should be driven into the cistern by reversing the tube, and gently 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 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 Hygrometer.—These should be placed alongside of each other, in a place freely exposed to the air, but protected from sunshine, 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-roofed box, or a double ventilated box with louvre-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 louvre-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 noticed, 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 somewhat 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 on the spot, should be read *always be read on the evenings*, so that the temperatures marked by the floats indicate the minimum and the maximum of the day on which the reading is taken. N.B.—The readings of these instruments are taken from that extremity of the float which is nearest the *head of the column* of mercury or of spirit.

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

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

Hygrometer.—The *wet* bulb requires the muslin covering it to be often changed. In towns once a month, or oftener, if the weather is dusty, and the muslin gets foul; in the country whenever the muslin seems to be foul. The bulb should be covered with thin muslin, and fixed from a solution of washing starch, before being used; and the cotton wick which conducts moisture to it should be previously soaked in a solution of washing soda, and then in pure water, before being attached, in order that it may be thoroughly wetted, else it will conduct the moisture imperfectly, and yield false results. In frosty weather, water must be poured over the wet bulb, so as to form a thin film of ice on the muslin, the evaporation from the ice going on as from the simply wetted bulb.

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

Winds.—Isolated Wind-vanes or Weather-cocks are apt to give false indications of the general direction of the wind, in consequence of the currents of air at the surface of the ground being so much influenced by the neighbourhood of hills, valleys, buildings, etc. Where low clouds are seen drifting along, their direction in reference to known objects, or as noted by means of a mirror on which a compass may be laid, or by means of a circular mirror fixed over the centre of a pocket compass, will, in general, give the true direction of the current of air near the earth's surface if these clouds are near and immediately over head, that is, in or near the zenith of the observer. The motion of the higher strata of clouds gives no such indication. Failing the clouds, the general direction of the smoke of a 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 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 sunshine, so that the indications noted in the column for clouds would not necessarily express, or agree with, the column for sunshine. As the full moon, *so long as it is above the horizon*, is thought by some eminent astronomers to have a powerful effect in dispelling clouds, it would be well to note in the General Remarks any facts bearing on this point, for a few days (or nights, as the case may be) before and after every full moon; and the same observations ought to be made at the periods of new moon.

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

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

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

Ozone.—Mention whether Schonbein's or Moffat's scale and papers are used. Schonbein's are preferred. They may be had at Messrs Adie and Sons, 50, Princes Street, and at Mr Brown's, 260, 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. 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.	Divested of Leaves.	CROPS, mentioning variety.	Sowing or Planting.	Appearing above Ground.	In Ear or Flower.	First Cut or Raised.
Alder,					Barley,				
Ash,					Bere or Bigg,				
Beech,					Oats,				
Birch					Wheat,				
Elm,					Beans,				
Larch,					Pease,				
Lime,					Potatoes,				
Oak,					Turnips,				
Sycamore or Plane,					Rye Grass,				

SHRUBS, ETC.	First in Blossom.	FRUITS.	First in Blossom.	Fruit Ripe generally.	MIGRATORY BIRDS.	First Arrival.	Departure.
Barberry,		Apple,			Cuckoo,		
Bourtree or Elder,		Black Currant,			Curlew,		
Broom,		Cherry,			House-Swallow,		
Hazel,		Gean,			Lapwing,		
Hawthorn,		Gooseberry,			Plover,		
Holly,		Peach,			Sand-Martin,		
Laburnum,		Pear,			Starling,		
Lilac,		Plum,			Swan,		
Mezereon,		Strawberry,			Rail or Corn Crake,		
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.

METEOROLOGICAL RETURNS.

To
Mr STARK,
Secy. Meteorological Society,
16 Hill Street Square
Edinburgh.

P M
EDINBURGH
AP 2
59

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SCOTTISH METEOROLOGICAL SOCIETY.

Observations taken at Aberdeen, County of Aberdeen, in Lat. 57° 9′ N., Long. 2° 6′ W., Height above Sea 115 feet.

Distance from Sea 2½ miles. During the MONTH of March 1859.

Days of Month.	Barometer. ___h. A.M. (inches.)	Attached Thermometer (°)	Barometer. ___h. P.M. (inches.)	Attached Thermometer (°)	Self-Registering Thermometers. Protected. Highest in Air. (°)	Lowest in Air. (°)	Exposed. Max. Black bulb in Sun. (°)	Min. Black bulb during Night. (°)	Hygrometer. ___h. A.M. Dry bulb. (°)	Wet bulb. (°)	___h. P.M. Dry bulb. (°)	Wet bulb. (°)
1												
2												
3												
4												
5												
6												
7												
8												
9												
10												
11												
12												
13												
14												
15												
16												
17												
18												
19												
20												
21												
22												
23												
24												
25												
26												
27												
28												
29												
30												
31												
Sums.												
Means.												
Index Errors.												
Correction for Diurnal Range.‡												
Corrected Means.												
No. of Column.	1	2	3	4	5	6	7	8	9	10	11	12

Days of Month.	Wind. ___h. A.M. Direction.	Force †† (lbs)	___h. P.M. Direction.	Force †† (lbs)	Rain. Days on which it fell. (days.)	Amount. (inches.)	Cloud. 1 to 10	Sunshine. Hours.	Thermometers under Ground. ___h. A.M. 3 inches. (°)	12 inches. (°)	22 inches. (°)	Temperature of SPRING or WELL. (°)	Sea. Temperature. (°)	Density.	Ozone. 0 to 10 A.M.	P.M.	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.
1	SW	4	W	2.25	0		2	10				42.5						aurora borealis	1
2	SW	4	SW	2.25	1		9	0				42.5							2
3	SW	0.25	W	0.25	0		4	8				42.5						mock sun, aurora borealis	3
4	SW	0.25	W	2.25	0		7	5				43							4
5	NW	0.25	W	4	1		9	3				43							5
6	W	0.25	SW	4	1		8	2				43							6
7	SW	9	W	4	1		3	8				43							7
8	NW	9	NW	16	0		6	4				43						snow showers	8
9	NW	9	SW	4	0		5	6				43						aurora borealis	9
10	SW	2.25	SW	4	0		7	5				43							10
11	S	4	W	4	1		8	2				43							11
12	NW	9	SW	1	1		6	9				43							12
13	NW	4	Var	0.25	1		2	10				43							13
14	NE	2.25	SE	2.25	0		3	9				43							14
15	Var	4	N	4	1		9	0				43						sleet showers	15
16	SW	2.25	SW	9	0		8	6				43						solar halo	16
17	SW	9	SW	2.25	1		8	2				43							17
18	NW	4	NW	4	1		7	7				43							18
19	SW	0.25	W	1	1		9	0				43							19
20	SW	9	SW	4	0		8	2				43							20
21	NW	4	NW	9	0		8	2				43						a little snow, a little hail	21
22	NW	4	NW	1	1		9	0				43							22
23	NW	4	NW	2.25	1		9	0				43.5							23
24	NE	1	NE	1	1		10	0				43.5							24
25	E	1	Var	1	1		10	0				43.5							25
26	NW	4	NW	4	1		6	5				43.5							26
27	NW	4	SW	1	0		9	0				43.5						aurora borealis	27
28	Var	1	Var	0.25	1		10	0				44							28
29	N	2.25	N	2.25	0		9	0				44						sleet showers, snow showers	29
30	NW	4	NW	4	0		7	4				44						snow showers, hail showers, aurora bor.	30
31	NW	4	W	2.25	0		2	10				44						a little snow	31
Sums.		119.25		102.75	17	1.75	217	119				1338						1 mile SW of centre of Aberdeen	
Means.		3.85		3.31		2.00	7.0					43.2						Wm & J Smith W Hemhill 3 miles SW of centre of Aberdeen	
Index Errors.						1.85												Wm & D Milne Rubislaw Work 1½ miles of centre of Aberdeen	
Correction for Diurnal Range.‡																			
Corrected Means.																			
No. of Column.	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.),.....= Column No. 3 (P.M.),.....= Barometer, Highest observed reading of Month,.....= on the

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

Sum,..... Sum,.....

Correction for Temperature from Column No. 2 to be deducted,.....=− Temp. from Col. 4,.....=− Difference, or Monthly Range,.....=

Sum,..... Sum,.....

Mean of the above .....

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

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

SUMMARY OF THE WINDS.

Direction.	N	NE	E	SE	S	SW	W	NW	Calm or Variable.	Mean Force.	Mean Velocity in miles per day.
A.M.	1	2	1	0	1	10	1	13	2		3.85
P.M.	1	2	0	1	0	9	8	7	3		3.31
Mean.	1	2	1	1	1	9½	4½	10	2½		3.58
	1"	2"	0"	1"	0"	10"	4"	10"	3"		

Force of Wind reckoned on scale 90 lb or 0.75 lb on sqft according to card formerly sent by Dr Stark

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

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

† Dew-point Temperature,.....

† Elastic Force of Vapour,.....

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

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

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

Highest Reading Self-Registering Thermometer in Air and Protected, ... on the

Lowest do. do. do., ... on the

Difference, being Monthly Range,.....

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

Mean Daily Range in Air and Protected, ...

Greatest Daily Range, do., ... on the

Highest Reading Self-Registering Black Bulb Thermometer in Sun, ... on the

Lowest do. do. from Radiation during Night, ... on the

†† In the above columns for the registration of the Force of the Wind, may be entered the *number of revolutions*, by Professor Robinson's Cup Wind Gauge, which registers the velocity of the Wind—540 revolutions being equal to one statute mile.

* If the readings are taken at 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.

(*Signed*) Alex Cruickshank

(*Designation*) 12 Rose St Aberdeen

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

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

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

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

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

Clouds.—The Society recommends observers to adopt the Howard nomenclature of clouds. The scale of cloud in the visible sky is reckoned from 0 to 10. Thus, a sky quite free from cloud is 0; a sky half covered with cloud is 5; and the whole visible sky covered with cloud is 10. Clouds often cover three-fourths or even more of the visible sky without obstructing the sunshine, so that the indications noted in the column for clouds would not necessarily express, or agree with, the column for sunshine. As the full moon, *so long as it is above the horizon*, is 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 observation ought to be made at the periods of new moon.

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

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

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

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

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.

Ozone.—Mention whether Schonbein's or Moffat's scale and papers are used. Schonbein's are preferred. They may be had at Messrs Adie and Son's, 50, 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. 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.	Divested of Leaves.	CROPS, mentioning variety.	Sowing or Planting.	Appearing above Ground.	In Ear or Flower.	First Cut or Raised.
Alder,					Barley,				
Ash,					Bere or Bigg,				
Beech,					Oats,				
Birch,					Wheat,				
Elm,	5th Mar				Beans,				
Larch,		14th Mar			Pease,				
Lime,		22d Mar			Potatoes,				
Oak,					Turnips,				
Sycamore or Plane,		18th Mar			Rye Grass,				

SHRUBS, ETC.	First in Blossom.	FRUITS.	First in Blossom.	Fruit Ripe generally.	MIGRATORY BIRDS.	First Arrival.	Departure.
Barberry,		Apple,			Cuckoo,		
Bourtree or Elder,		Black Currant,			Curlew,		
Broom,		Cherry,			House-Swallow,		
Hazel,		Gean,			Lapwing,		
Hawthorn,		Gooseberry,	24th May		Plover,		
Holly,		Peach,			Sand-Martin,		
Laburnum,		Pear,			Starling,		
Lilac,		Plum,			Swan,		
Mezereon,		Strawberry,			Rail or Corn Crake,		
Mountain Ash or Rowan,					Other Birds, naming them—		
Red Flowering Currant,	24th Mar						
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.

To
DR STARK,
Meteorological Society,
16 Rutland Street,
EDINBURGH.

H M
EDINBURGH
APR 4
58

SCOTTISH METEOROLOGICAL SOCIETY.

Observations taken at Aberdeen, County of Aberdeen, in Lat. 57°9, Long. 2°6′, Height above Sea 115 feet.

Distance from Sea _____ miles. During the MONTH of April 1859.

Days of Week.	Days of Month.	BAROMETER. 8¾ h. A.M. Barometer.	Attached Thermometer	BAROMETER. (8¾ h.?) P.M. Barometer.	Attached Thermometer	SELF-REGISTERING THERMOMETERS. Protected. Highest in Air.	Lowest in Air.	Exposed. Max. Black bulb in Sun.	Min. Black bulb during Night.	HYGROMETER. 8¾ h. A.M. Dry bulb.	Wet bulb.	___ h. P.M. Dry bulb.	Wet bulb.	WIND. ___ h. A.M. Direction.	Force	___ h. P.M. Direction.	Force	RAIN. Days on which it fell.	Amount.	CLOUD. 1 to 10	SUNSHINE. Hours.	THERMOMETERS. under Ground. ___ h. A.M. 3 inches.	12 inches.	22 inches.	Temperature of SPRING or WELL.	Temperature of SEA.	OZONE. 0 to 10	ELECTRICITY.	GENERAL REMARKS. As to occurrence of Thunder, Lightning, Storms, Hail, Meteors, Remarkable Depression or Elevation of Barometer, etc. *Mention the hour at which these began and ended*	Days of Month.
		inches.	°	inches.	°	°	°	°	°	°	°	°	°					days.	inches.			°	°	°	°	°		°		
	1	29.844	42	29.368	42	38	22.5			37	33.5																			1
	2	29.748	47	29.360	47	43	29			43	40																			2
	3	29.714	45	29.622	50	38	22.5			37	33.5																			3
	4	29.811	53	29.974	50	54	38			47.5	43.5																			4
	5	29.784	54	29.920	51	57	39			53.5	48.5																			5
	6	29.844	55	29.796	56	59	42			50.5	49.5																			6
	7	29.722	61	29.708	59	61	44			59	53																			7
	8	29.542	58	29.270	53	64	37			52	50																			8
	9	29.302	59	29.272	56	54	38			52.5	45.5																			9
	10	29.108	55	28.940	51	54	36			45.5	44																			10
	11	29.138	48	29.458	46	46	32			39	38.5																			11
	12	29.554	52	29.426	45	41.5	28.5			38.5	35																			12
	13	29.400	51			42	27			38	33.5																			13
	14	29.356	49	29.196	48	42	24			38	34.5																			14
	15	29.226	49	29.386	46	46	27			38.5	37																			15
	16	29.408	45	29.552	45	39	25			33	32																			16
X	17	29.696	48	29.750	45	40	27			37	35																			17
	18	29.674	45	29.580	43	39	24			34	32.5																			18
	19	29.570	45	29.560	46	40	27			40	37																			19
	20	29.506	49	29.500	53	42	28			38.5	37																			20
	21	29.488	54	29.586	45	52	27			48.5	45																			21
	22	29.604	47	29.720	47	43	25			37.5	34																			22
	23	29.850	51	30.010	50	45	29			42.5	39.5																			23
	24	30.080	50	30.166	50	47	36			45	41.5																			24
	25	30.220	51	30.288	50	48	38			46	44																			25
	26	30.360	53	30.382	49	48	37			46	41.5																			26
	27	30.376	53		×	48	36			46	42																			27
	28	30.134	61	30.028	51	48	37			47	42.5																			28
	29	30.038	55	30.050	55	48	36			45	43																			29
	30	30.066	55	29.982	50	49	31			45.5	39																			30
	31																													31
	Sums.	21.163	1540	18.850	1379	1415.5	949.5			1301.0	1205.0																			
	Means.	29.705	51.3	29.673	49.2	47.2	31.6			43.4	40.2																			
	Correction for Index Errors.	-.018																												
	Correction for Diurnal Range.‡									-0.2	-0.5																			
	Corrected Means.									43.2	39.7																			
	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.), ... = 29.705 Column No. 3 (P.M.), ... = 29.673

~~Diameter of tube ___ inch; correction for capillarity to be added,~~ ..... + -.018 ~~Capillarity,~~ ..... = + -.018

Sum, ... 29.687 Sum, ... 29.655

Correction for Temperature from Column No. 2 to be deducted, ... = - .060 Temp. from Col. 4, ... = - .055

Sum, ... 29.627 Sum, ... 29.600

Mean of the above 29.614

Correction for Height above Sea-level, _____ feet, to add, ... .120

Barometer corrected and reduced to 32° and Sea-level, ... 29.740

Barometer, Highest observed reading of Month, ... = 30.382 on the 26th

Lowest do. do., ... = 28.940 on the 10th

Difference, or Monthly Range, ... = 1.442

SUMMARY OF THE WINDS.

Direction.	N	NE	E	SE	S	SW	W	NW	Calm or Variable.	Mean Force.
A.M.										
P.M.										

Dry bulb Thermometer (mean of Cols. 9 and 11),* 43.4 43.2

Wet bulb Thermometer (mean of Cols. 10 and 12),* 40.2 39.7

† Dew-point Temperature, ... 36.4 35.5

† Elastic Force of Vapour, ... .215 .208

† Weight of Vapour in a Cubic Foot of Air, ... 2.5

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

† Degree of Humidity (Saturation 100), ... 76 75

Highest Reading Self-Registering Thermometer in Air and Protected, ... 64° on the 8th

Lowest do. do. do., ... 22.5 on the 1st & 3d

Difference, being Monthly Range, ... 41.5

Mean of Self-Registering Thermometers in Air and Protected, ... 39.4 - 1.6 = 37.8 | 40.5 Mean temp.ᵉ for entry

Mean Daily Range in Air and Protected, ... 15.6

*Greatest Daily Range, do., ... 27

Highest Reading Self-Registering Black Bulb Thermometer in Sun, ... _____ on the _____

Lowest do. do. from Radiation during Night, _____ on the _____

(Signed) Thomas David Gray

(Designation) Student

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

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

Correction for Index error and Capillarity in one Sum

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-days, should be read at the same hour morning and evening, in order to furnish mean results. The Society recommends *a quarter before nine o'clock, morning and evening*, as the most convenient hour; but should this be inconvenient for the observer, another hour may be chosen, attending, however, to the above rule, that the evening and morning readings be taken at the same hour, and this hour entered on the Schedule.

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

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

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

Self-Registering Thermometers and Hygrometer.—These should be placed alongside of each other, in a place freely exposed to the air, but protected from sunshine, and from reflected heat, as well as from radiation and from rain, 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 louvre-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 louvre-boarded sides, fixed in an exposed place, and if possible over grass. Whatever means are finally decided on, the position of this instrument should be mentioned, and should not be changed (without due notice being given to the Secretary), in order that the results of one month's observations may be strictly comparable with those of another.

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

The *maximum* Registering Thermometer, for taking the extreme heat of the sun's rays, should have its bulb blackened and the surface rendered dull, and it should be mounted in a blackened box, whose sides should be so 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 raiset on wooden supports a few inches above the surface, and removed during the day.

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

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FOREST TREES.	In Flower.	Leaf Buds first appear.	In Leaf.	Divested of Leaves.
Alder,				
Ash,				
Beech,				
Birch,				
Elm,				
Larch,				
Lime,				
Oak,				
Sycamore or Plane,				

CROPS, mentioning variety.	Sowing or Planting.	Appearing above Ground.	In Ear or Flower.	First Cut or Raised.
Barley,				
Bere or Bigg,				
Oats,				
Wheat,				
Beans,				
Pease,				
Potatoes,				
Turnips,				
Rye Grass,				

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

FRUITS.	First in Blossom.	Fruit Ripe generally.
Apple,		
Black Currant,		
Cherry,		
Gean,		
Gooseberry,		
Peach,		
Pear,		
Plum,		
Strawberry,		

MIGRATORY BIRDS.	First Arrival.	Departure.
Cuckoo,		
Curlew,		
House-Swallow,		
Lapwing,		
Plover,		
Sand-Martin,		
Starling,		
Swan,		
Rail or Corn Crake,		
Other Birds, naming them—		

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

METEOROLOGICAL RETURNS.

EDINBURGH.

~~21, Rutland Street,~~

Sec., Meteorological Society,

DR STARK,

Everett,

Sec.y Meteorological Soci

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EDINBURGH
MAY 3
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SCOTTISH METEOROLOGICAL SOCIETY.

Observations taken at Aberdeen, County of Aberdeen, in Lat. 57°9′N, Long. 2°6′W, Height above Sea 115 feet.

Distance from Sea 2 miles. During the MONTH of April 1859.

Phasis of Moon.	Days of Month.	Barometer. ___h. A.M. (inches.)	Attached Thermometer (°)	Barometer. ___h. P.M. (inches.)	Attached Thermometer (°)	Self-Registering Thermometers. Protected. Highest in Air. (°)	Lowest in Air. (°)	Exposed. Max. Black bulb in Sun. (°)	Min. Black bulb during Night. (°)	Hygrometer. ___h. A.M. Dry bulb. (°)	Wet bulb. (°)	___h. P.M. Dry bulb. (°)	Wet bulb. (°)	Wind. ___h. A.M. Direction.	Force †† (lbs)	___h. P.M. Direction.	Force †† (lbs)	Rain. Days on which it fell. (days.)	Amount. (inches.)	Cloud. 1 to 10	Sunshine. Hours.	Thermometers under Ground. ___h. A.M. 3 inches. (°)	12 inches. (°)	22 inches. (°)	Temperature of SPRING or WELL. (°)	Sea. Temperature. (°)	Density.	Ozone. 0 to 10 A.M.	P.M.	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.
	1													SW	4	SW	9	1		9	0				44							1
	2													SW	1	NE	0·25	1		8	1				46						solar halo, sleet, aurora borealis	2
	3													S	1	var	0·25	1		9	0				44							3
	4													N	0·25	var	0·25	1		9	0				44						solar halo	4
	5													W	0·25	W	0·25	1		7	6				44							5
	6													SW	0·25	SW	0·25	0		9	1				44							6
	7													SW	2·25	SW	2·25	0		7	7				44							7
	8													SW	0·25	SW	2·25	1		9	0				44							8
	9													var	0·25	var	0·25	0		8	7				44							9
	10													NE	0·25	NE	9	1		10	0				44							10
	11													N	9	N	9	1		8	2				44							11
	12													N	4	var	1	0		7	4				44						snow, hail	12
	13													NW	1	NW	1	0		5	9				44						snow, hail	13
	14													NW	1	var	1	0		4	11				43·5						hail	14
	15													N	4	N	4	0		7	5				43·5						snow, hail	15
	16													NW	4	NW	4	0		7	7				43·5						snow	16
	17													NW	4	NW	4	0		7	8				43·5						snow	17
	18													NW	4	NW	4	0		4	10				43·5						snow	18
	19													NW	0·25	var	0·25	1		8	5				43·5						snow	19
	20													W	0·25	SW	0·25	0		8	3				43·5						snow	20
	21													NW	0·25	NW	0·25	0		7	5				43·5						snow, hail, aurora borealis	21
	22													NW	2·25	NW	2·25	0		5	10				43·5							22
	23													NW	0·25	var	0·25	1		4	7				43·5						hail, aurora borealis	23
	24													E	0·25	SE	4	1		8	4				44							24
	25													SE	4	SE	9	0		7	6				44							25
	26													SE	4	SE	4	0		5	9				44							26
	27													SE	4	SE	4	0		3	11				44							27
	28													SE	2·25	SE	4	0		2	11				44						aurora borealis	28
	29													E	1	NE	1	0		1	13				44						aurora borealis	29
	30													NE	1	var	0·25	0		7	7				44							30
	31																															31
Sums.															60·5		81·5	11	Mean amount 3·2	199	169				1315							
Means.															2·0		2·7		3·1	6·6					43·8							
Index Errors.																																
Correction for Diurnal Range.‡																																
Corrected Means.																																
No. of Column.		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25		26		27		

Balmoral Pier 1 mile SW of Centre of Aberdeen — 3·4

Dalhousie 2 miles S of Centre of Aberdeen — 4·2

Milne Robertson Works 1 mile W of Aberdeen

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

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

Sum, ... _____

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

Sum, ... _____

Mean of the above ..... _____

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

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

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

Capillarity, ... = + _____

Sum, ... _____

Temp. from Col. 4, ... = − _____

Sum, ... _____

Barometer, Highest observed reading of Month, ... = _____ on the _____

Lowest do. do., ... = _____ on the _____

Difference, or Monthly Range, ... = _____

SUMMARY OF THE WINDS.

Direction.	N	NE	E	SE	S	SW	W	NW	Calm or Variable.	Mean Force.	Mean Velocity in miles per day.
A.M.	4	2	2	6+1	5	2	9	1		2·0	1
P.M.	2	3	0	5	0	5	1	6	8	2·7	
Mean.	3	2	1	5	0	5	2	8	4	2·3	1 mile per foot

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

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

† Dew-point Temperature, ... _____

† Elastic Force of Vapour, ... _____

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

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

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

Highest Reading Self-Registering Thermometer in Air and Protected, ... _____ on the _____

Lowest do. do. do., ... _____ on the _____

Difference, being Monthly Range, ... _____

Mean of Self-Registering Thermometers in Air and Protected, ... _____

Mean Daily Range in Air and Protected, ... _____

Greatest Daily Range, do., ... _____ on the _____

Highest Reading Self-Registering Black Bulb Thermometer in Sun, ... _____ on the _____

Lowest do. do. from Radiation during Night, _____ on the _____

†† In the above columns for the registration of the Force of the Wind, may be entered the *number of revolutions*, by Professor Robinson's Cup Wind Gauge, which registers the velocity of the Wind—540 revolutions being equal to one statute mile.

* If the readings are taken at 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.

(*Signed*) Alex^r Cruickshank

(*Designation*) 12 Rose St Aberdeen

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.

A

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 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 Hygrometer.—These should be placed alongside of each other, in a place freely exposed to the air, but protected from sunshine, and from reflected heat, as well as from radiation and from rain, and as 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 louvre-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 louvre-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.

Self-Registering Thermometers, shortened to S.R.T. In the case of the ordinary *maximum* Thermometer, fill the bulb 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 on the index; and in the case of the *minimum* Thermometer, the bulb must be slightly depressed, to prevent a draining of the spirit to the top of the tube, and also that any part raised in vapour may return to the column. These Thermometers, if read once a-day, should *always be read on the evenings*, so that the temperatures marked by the floats indicate the minimum and the maximum of the day on which the reading is taken. N.B.—The readings of these instruments are taken from that extremity of the float which is nearest the *head of the column* of mercury or of spirit.

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

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

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

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

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

Clouds.—The Society recommends observers to adopt the Howard nomenclature of clouds. The scale of cloud in the visible sky is reckoned from 0 to 10. Thus, a sky quite free from cloud is 0; a sky half covered with cloud is 5; and the whole visible sky covered with cloud is 10. Clouds often cover three-fourths or even more of the visible sky without obstructing the sunshine, so that the indications noted in the column for clouds would not necessarily express, or agree with, the column for sunshine. As the full moon, *so long as it is above the horizon*, is 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 pitcher, covered with a sloping lid, and with a weight attached, is sunk to the required depth, and in ten minutes drawn up and read. The density of the sea water should, if possible, be taken at the same time. Convenient instruments are furnished by Messrs Adie and Son.

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

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.

Ozone.—Mention whether Schonbein's or Moffat's scale and papers are used. Schonbein's are preferred. They may be had at Messrs Adie and Son's, 50, 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. 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.	Divested of Leaves.	CROPS, mentioning variety.	Sowing or Planting.	Appearing above Ground.	In Ear or Flower.	First Cut or Raised.
Alder,		Apr 1			Barley,				
Ash, Apr 14					Bere or Bigg,				
Beech,		Apr 20			Oats,				
Birch,		Apr 15			Wheat,				
Elm,					Beans,				
Larch,					Pease,				
Lime,					Potatoes,				
Oak,					Turnips,				
Sycamore or Plane,					Rye Grass,				

SHRUBS, ETC.	First in Blossom.	FRUITS.	First in Blossom.	Fruit Ripe generally.	MIGRATORY BIRDS.	First Arrival.	Departure.
Barberry,		Apple,			Cuckoo,		
Bourtree or Elder,		Black Currant,			Curlew,		
Broom,		Cherry, Apr 8			House-Swallow,		
Hazel,		Gean, Apr 8			Lapwing,		
Hawthorn,		Gooseberry,			Plover,		
Holly,		Peach,			Sand-Martin,		
Laburnum,		Pear, Apr 8			Starling,		
Lilac,		Plum,			Swan,		
Mezereon,		Strawberry,			Rail or Corn Crake,		
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.

The frost & stormy weather of 3rd & 4th weeks of April blasted & scared the young leaves of poplars bourtree bushes & fruit trees & killed some of the early gooseberry & pear blossom. Snow stopped grain sowing & potato planting on 12th & 25th April

P E
EDINBURGH
MY 3
59

SCOTTISH METEOROLOGICAL SOCIETY.

Observations taken at Aberdeen, County of Aberdeen, in Lat. 57.9 N, Long. 2.6 W, Height above Sea 115 feet.

Distance from Sea 1½ miles. During the MONTH of May 1859.

Days of Month.	Barometer. 8¾ h. A.M. Barometer. (inches.)	Attached Thermometer (°)	9 h. P.M. Barometer. (inches.)	Attached Thermometer (°)	Self-Registering Thermometers. Protected. Highest in Air. (°)	Lowest in Air. (°)	Exposed. Max. Black bulb in Sun. (°)	Min. Black bulb during Night. (°)	Hygrometer. 8¾ h. A.M. Dry bulb. (°)	Wet bulb. (°)	___ h. P.M. Dry bulb. (°)	Wet bulb. (°)	Wind. ___ h. A.M. Direction.	Force	___ h. P.M. Direction.	Force	Rain. Days on which it fell. (days.)	Amount. (inches.)	Cloud. 1 to 10.	Sunshine. Hours.	Thermometers under Ground. ___ h. A.M. 3 inches. (°)	12 inches. (°)	22 inches. (°)	Temperature of SPRING or WELL. (°)	Temperature of SEA. (°)	Ozone. 0 to 10	Electricity. (°)	General Remarks. As to occurrence of Thunder, Lightning, Storms, Hail, Meteors, Remarkable Depression or Elevation of Barometer, etc. Mention the hour at which these began and ended.	Days of Month.
1	29.980	54	30.056	53	48	34			47.5	41																			1
2	30.084	53	30.060	53	50	33			46	41																			2
3	30.046	53	30.028	49	50	33			41	45																			3
4	29.984	51	29.928	53	49	33			45.5	41																			4
5	29.924	54	29.976	52	52	34			47	41.5																			5
6	29.700	53	29.962	53	51	37			49	45																			6
7	29.900	55	29.864	49	53	40			50	47																			7
8	30.066	55	30.232	55	52	36			45.5	45.5																			8
9	30.250	58	30.268	56	58	31			51.5	48																			9
10	30.238	54	30.292	55	56	39			52.5	47																			10
11	30.300	54	30.300	53	54	40			51	48																			11
12	30.230	57	30.226	53	54	40			51.5	48																			12
13	30.190	57	30.256	51	54	42			51.5	47.5																			13
14	30.272	58	30.190	55	54	38			54	47																			14
15	30.154	59	30.088	58	61	38			55	45																			15
16	30.108	62	30.038	58	66	38			56	48																			16
17	30.008	64	29.946	64	68	40			60	50																			17
18	29.960	64	30.002	61	71	40			56	50.5																			18
19	30.008	60	29.966	59	57	44			51	49																			19
20	29.908	59	29.978	57	57	44			53.5	51																			20
21	30.000	57	30.078	55	58	40			58	47																			21
22	30.122	58	30.168	55	58	39			54	47.5																			22
23			30.106	56																									23
24	30.054	59	29.940	59	61	42			56	50																			24
25	29.918	61	29.936	59	65	45			54	51																			25
26	29.902	63	29.984	61	59	42.5			57.7	49																			26
27	30.016	65	30.004	66	66	47			58.5	51																			27
28			29.948	65																									28
29	29.868	67	29.950	66	73	41			60.5	57																			29
30	29.930	67	29.906	68	68	41			65	53.5																			30
31	29.880	70		68	68	50			65.5	55.25																			31
Sums.	30.033	1721	31.676	1775	1691	1142			1545	1356.5																			
Means.	30.034	58.7	30.056	57.3	58.3	39.3			53.3	47.7																			
Correction for Index Errors and Capillarity.	-.018		-.018																										
Correction for Diurnal Range.‡									~~-1.1~~	~~-1.1~~																			
									-1.5	-1.7																			
Corrected Means.	30.016		30.038						51.8	46.0																			
									~~52.2~~	~~46.6~~																			
No. of Column.	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27		

Barometer, mean corrected reading of Column No. 1 (A.M.), ... = _____ Column No. 3 (P.M.), ... = _____

~~Diameter of tube _____ inch; correction for capillarity to be added,~~ ..... + _____ Capillarity, ... = + _____

Sum, ... 30.016 Sum, ... 30.038

Correction for Temperature from Column No. 2 to be deducted, ... = − .081 Temp. from Col. 4, ... = − .076

Sum, ... 29.935 Sum, ... 29.962

Mean of the above 29.948

Correction for Height above Sea-level, _____ feet, to add, ... .126

Barometer corrected and reduced to 32° and Sea-level, ... 30.074

Barometer, Highest observed reading of Month, ... = 30.300 on the 11th

Lowest do. do., ... = 29.700 on the 6th

Difference, or Monthly Range, ... = 0.600

Summary of the Winds. Direction.	N	NE	E	SE	S	SW	W	NW	Calm or Variable.	Mean Force.
A.M.										
P.M.										

Dry bulb Thermometer (mean of Cols. 9 and 11),*	57.8	~~52.2~~ 52.2	
Wet bulb Thermometer (mean of Cols. 10 and 12),*	46.0	~~46.6~~ 46.6	
† Dew-point Temperature,	40.1	~~42.1~~ 40.9	
† Elastic Force of Vapour,	.248	~~.268~~ .256	
† Weight of Vapour in a Cubic Foot of Air,	~~2.9~~ 3	2.90	
† Additional Weight required to Saturate a Cubic Foot,			
† Degree of Humidity (Saturation 100),	64	~~64~~ 66	

Highest Reading Self-Registering Thermometer in Air and Protected, ... 73 on the 29th

Lowest do. do. do., ... 31 on the 9th

Difference, being Monthly Range, ... 42

Mean of Self-Registering Thermometers in Air and Protected, ... 45.8 — 2.1 = 46.7 | 49.2 Mean temp. for entry

~~— 1.4 = 47.4~~

Mean Daily Range in Air and Protected, ... 19.0

Greatest Daily Range, do., ... 32.0

Highest Reading Self-Registering Black Bulb Thermometer in Sun, ... _____ on the _____

Lowest do. do. from Radiation during Night, _____ on the _____

* 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.

(Signed) Thomas David Gray

(Designation) Student

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.

Index error and capillarity in one term 98.5 / 49.2

INSTRUCTIONS FOR MAKING METEOROLOGICAL OBSERVATIONS.

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

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

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

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

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

Self-Registering Thermometers and Hygrometer.—These should be placed alongside of each other, in a place freely exposed to the air, but protected from sunshine, and from reflected heat, as well as from radiation and from rain, and as 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 louvre-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 louvre-boarded sides, fixed in an exposed place, and if possible over grass. Whatever means are finally decided on, the position of the instruments should be mentioned, and should not be changed (without due notice being given to the Secretary), in order that the results of one month's observations may be strictly comparable with those of another.

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

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

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

Hygrometer.—The *wet-bulb* requires the muslin covering 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 always be thoroughly wetted, and freed from the muslin, by being covered with the tissue or blotting paper below. The muslin should be always kept free from starch, before being used, and the cotton-wick which conducts the moisture to it should be previously baked in a solution of pearl-ash or 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, wax ascertains the presence of the electricity.

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

Winds.—Isolated Wind-vanes or Weather-cocks are apt to give false indications of the general direction of the wind, in consequence of the currents of air at the surface of the ground being so much influenced by the neighbourhood of hills, valleys, buildings, etc. Where low clouds are seen drifting along, their direction in reference to known objects, or as noted by means of a mirror on which a compass may be laid, or by means of a circular mirror fixed over the centre of a pocket compass, will, in general, give the true direction of the current of air near the earth's surface if these clouds are near and immediately over head, that is, in or near the zenith of the observer. The motion of the higher strata of clouds gives no such indication. Failing the clouds, the general direction of the smoke of a 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 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 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.

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

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

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

Ozone.—Whether Schoenbein's or Moffat's scale and papers are used. Schoenbein'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. 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.	Divested of Leaves.	CROPS, mentioning variety.	Sowing or Planting.	Appearing above Ground.	In Ear or Flower.	First Cut or Raised.
Alder,					Barley,				
Ash,					Bere or Bigg,				
Beech,					Oats,				
Birch,					Wheat,				
Elm,					Beans,				
Larch,					Pease,				
Lime,					Potatoes,				
Oak,					Turnips,				
Sycamore or Plane,					Rye Grass,				

SHRUBS, ETC.	First in Blossom.	FRUITS.	First in Blossom.	Fruit Ripe generally.	MIGRATORY BIRDS.	First Arrival.	Departure.
Barberry,		Apple,			Cuckoo,		
Bourtree or Elder,		Black Currant,			Curlew,		
Broom,		Cherry,			House-Swallow,		
Hazel,		Gean,			Lapwing,		
Hawthorn,		Gooseberry,			Plover,		
Holly,		Peach,			Sand-Martin,		
Laburnum,		Pear,			Starling,		
Lilac,		Plum,			Swan,		
Mezereon,		Strawberry,			Rail or Corn Crake,		
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.

To
Mr J. G. Smith
Aberdeen Sec.y Meteorological Society
N. of Adam Square
Edinburgh

POSTAGE ONE PENNY
UNIPAID
ABERDEEN 22 JUN 1859
EDINBURGH JUN 2 59

115

SCOTTISH METEOROLOGICAL SOCIETY.

Observations taken at Aberdeen, County of Aberdeen, in Lat. 57°9'N, Long 2°6'W, Height above Sea 115 feet.

Distance from Sea 2 miles. During the MONTH of May 1859.

Days of Month.	Barometer. ___h. A.M. (inches.)	Attached Thermometer (°)	Barometer. ___h. P.M. (inches.)	Attached Thermometer (°)	Self-Registering Thermometers. Protected. Highest in Air. (°)	Lowest in Air. (°)	Exposed. Max. Black bulb in Sun. (°)	Min. Black bulb during Night. (°)	Hygrometer. ___h. A.M. Dry bulb. (°)	Wet bulb. (°)	___h. P.M. Dry bulb. (°)	Wet bulb. (°)
1												
2												
3												
4												
5												
6												
7												
8												
9												
10												
11												
12												
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22												
23												
24												
25												
26												
27												
28												
29												
30												
31												
Sums.												
Means.												
Index Errors.												
Correction for Diurnal Range.‡												
Corrected Means.												
No. of Column.	1	2	3	4	5	6	7	8	9	10	11	12

Days of Month.	Wind. ___h. A.M. Direction.	Force ††	___h. P.M. Direction.	Force ††	Rain. Days on which it fell. (days.)	Amount. (inches.)	Cloud. 1 to 10	Sunshine. Hours.	Thermometers under Ground. ___h. A.M. 3 inches. (°)	12 inches. (°)	22 inches. (°)	Temperature of SPRING or WELL. (°)	Sea. Temperature. (°)	Density.	Ozone. 0 to 10 A.M.	P.M.	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.
1	var	0·25	E	0·25	1		4	9				44							1
2	var	0·25	var	0·25	1		9	2				44							2
3	var	0·25	S	0·25	1		8	10				44·5							3
4	N	0·25	var	0·25	0		5	4				44·5							4
5	var	0·25	N	1	0		8	3				44·5							5
6	SW	4	S	4	0		1	14				44·5							6
7	S	4	S	4	1		9	3				45							7
8	var	0·25	var	0·25	0		3	12				45						solar halo	8
9	SW	0·25	S	0·25	0		2	14				45							9
10	SE	0·25	S	1	1		10	0				45·5						mist	10
11	SW	4	SW	4	0		3	0				45·5						mist	11
12	SW	4	SW	2·25	0		8	0				45·5						mist, solar halo	12
13	SW	4	SW	4	0		1	15				46							13
14	SW	4	SW	0·25	0		1	16				46							14
15	SW	1	SW	1	0		1	16				46·5							15
16	SE	0·25	S	1	0		1	16				46·5							16
17	S	0·25	S	0·25	0		2	16				47							17
18	N	1	N	1	0		8	5				47							18
19	N	4	N	2·25	1		10	0				47							19
20	N	0·25	N	1	0		9	2				47							20
21	SE	0·25	S	1	0		1	6				47·5							21
22	SE	1	var	1	0		4	10				47·5							22
23	S	1	S	1	0		1	16				47·5							23
24	S	1	SW	1	0		1	16				48							24
25	var	1	E	1	0		9	0				48							25
26	var	0·25	SW	0·25	0		6	9				48							26
27	E	0·25	var	0·25	0		2	14				48							27
28	var	0·25	E	0·25	0		3	12				48·5							28
29	NE	0·25	var	0·25	0		5	10				48·5							29
30	NE	0·25	NE	0·25	0		2	16				48·5							30
31	NE	4	NE	4	0		4	11				49						must	31
Sums.		42·25		38·75	6	0·15 0·18 0·16 Rain	144	215				432							
Means.		1·36		1·25			4·6					46·4							
Index Errors.																			
Correction for Diurnal Range.‡																			
Corrected Means.																			
No. of Column.	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27				

AD Milne & Islaw Works 1 mile SW of Aberdeen

Balmoral Place 1 mile SW of centre of Aberdeen

Mr A A Smith W Hamhill 3 miles SW of Aberdeen centre

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

Diameter of tube_____inch; correction for capillarity to be added,.....+ _____

Sum,..... _____

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

Sum,..... _____

Mean of the above ..... _____

Correction for Height above Sea-level,_____feet, to add,..... _____

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

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

Capillarity,.....= + _____

Sum,..... _____

Temp. from Col. 4,.....= − _____

Sum,..... _____

Barometer, Highest observed reading of Month,.....= _____ on the

Lowest do. do.,.....= _____ on the

Difference, or Monthly Range, ...= _____

SUMMARY OF THE WINDS.

Direction.	N	NE	E	SE	S	SW	W	NW	Calm or Variable.	Mean Force.	Mean Velocity in miles per day.
A.M.	4	3	1	4	4	7	0	0	8	1·36	
P.M.	4	2	3	0	9	7	0	0	6	1·25	
Mean.	4	2½	2	2	6½	7	0	0	7	1·25	

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

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

† Dew-point Temperature,..... _____

† Elastic Force of Vapour,..... _____

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

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

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

Highest Reading Self-Registering Thermometer in Air and Protected, ... _____ on the _____

Lowest do. do. do., ... _____ on the _____

Difference, being Monthly Range,..... _____

Mean of Self-Registering Thermometers in Air and Protected, ... _____

Mean Daily Range in Air and Protected, ... _____

Greatest Daily Range, do., ... _____ on the _____

Highest Reading Self-Registering Black Bulb Thermometer in Sun, ... _____ on the _____

Lowest do. do. from Radiation during Night, _____ on the _____

†† In the above columns for the registration of the Force of the Wind, may be entered the *number of revolutions*, by Professor Robinson's Cup Wind Gauge, which registers the velocity of the Wind—540 revolutions being equal to one statute mile.

* If the readings are taken at 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.

(*Signed*) Alex Cruickshank

(*Designation*) 12 Rose St Aberdeen

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.

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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.

Ozone.—Mention whether Schonbein's or Moffat's scale and papers are used. Schonbein's are preferred. They may be had at Messrs Adie and Son's, 50, 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. 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.	Divested of Leaves.	CROPS, mentioning variety.	Sowing or Planting.	Appearing above Ground.	In Ear or Flower.	First Cut or Raised.
Alder,			May 15		Barley, Chester	May 5	May 15		
Ash,		May 15	May 20		Bere or Bigg,				
Beech,	May 20		May 20		Oats,				
Birch,	May 2		May 2		Wheat,				
Elm,			May 15		Beans,				
Larch,	May 1				Pease,				
Lime,			May 12		Potatoes,		May 15		
Oak,	May 25	May 28	May 25		Turnips,	May 23	May 29		
Sycamore or Plane,	May 15		May 8		Rye Grass,			May 20	

SHRUBS, ETC.	First in Blossom.	FRUITS.	First in Blossom.	Fruit Ripe generally.	MIGRATORY BIRDS.	First Arrival.	Departure.
Barberry,	May 1	Apple,	May 6		Cuckoo,	Apr 28	
Bourtree or Elder,		Black Currant,	May 12		Curlew,		
Broom,	May 12	Cherry,			House-Swallow,	Apr 20	
Hazel,		Gean,			Lapwing,		
Hawthorn,	May 25	Gooseberry,			Plover,		
Holly,		Peach,			Sand-Martin,		
Laburnum,	May 25	Pear,			Starling,		
Lilac,	May 20	Plum,			Swan,		
Mezereon,		Strawberry,	May 25		Rail or Corn Crake,	May 9	
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.

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Abercorn
Bhny

To

DR STARK,

Sec., Meteorological Society,
Edin. Observ.
1, Rutland Street,
EDINBURGH.

METEOROLOGICAL RETURNS.

SCOTTISH METEOROLOGICAL SOCIETY.

Observations taken at Aberdeen, County of Aberdeen, in Lat. 57 9 N, Long. 2 6 W, Height above Sea 115 feet.

Distance from Sea _____ miles. During the MONTH of June 1859.

Days of Month.	Barometer. 8.45 h. A.M. Barometer.	Barometer. 8.45 h. A.M. Attached Thermometer	Barometer. 8.45 h. P.M. Barometer.	Barometer. 8.45 h. P.M. Attached Thermometer	Self-Registering Thermometers. Protected. Highest in Air.	Self-Registering Thermometers. Protected. Lowest in Air.	Self-Registering Thermometers. Exposed. Max. Black bulb in Sun.	Self-Registering Thermometers. Exposed. Min. Black bulb during Night.	Hygrometer. 8.45 h. A.M. Dry bulb.	Hygrometer. 8.45 h. A.M. Wet bulb.	Hygrometer. ___ h. P.M. Dry bulb.	Hygrometer. ___ h. P.M. Wet bulb.	Wind. ___ h. A.M. Direction.	Wind. ___ h. A.M. Force	Wind. ___ h. P.M. Direction.	Wind. ___ h. P.M. Force	Rain. Days on which it fell.	Rain. Amount.	Cloud. 1 to 10	Sunshine. Hours.	Thermometers under Ground. ___ h. A.M. 3 inches.	Thermometers under Ground. ___ h. A.M. 12 inches.	Thermometers under Ground. ___ h. A.M. 22 inches.	Temperature of SPRING or WELL.	Temperature of SEA.	Ozone. 0 to 10	Electricity.	General Remarks, As to occurrence of Thunder, Lightning, Storms, Hail, Meteors, Remarkable Depression or Elevation of Barometer, etc. Mention the hour at which these began and ended.	Days of Month.
	inches.	°	inches.	°	°	°	°	°	°	°	°	°					days.	inches.			°	°	°	°	°		°		
1	29.986	64	29.998	64	66	48			55.5	52.5																			1
2	30.000	63	29.996	61	67	47			54	51.5																			2
3	29.968	59	29.970	64	56	44			52	48																			3
4	29.984	67	30.128	68	61	43			59.5	57																			4
5	30.136	69	30.082	61	67	48			62.5	57.5																			5
6	30.058	62	30.046	60	64	51			61.5	58																			6
7	30.074	61	30.062	60	71	48			59.5	56.5																			7
8	30.060	64	30.076	63	66	47			57.5	54																			8
9	30.076	62	30.020	59	59	47			53.3	50.3																			9
10	29.926	58	29.838	58	55	44			53.3	50.7																			10
11	29.824	58	29.896	60	60	37			54.5	47.5																			11
12	29.910	60	29.914	63	59	45			55.5	52.3																			12
13	29.878	61	29.950	67	65	45			55	49.5																			13
14	29.952	65	29.884	60	59	40			51	47.5																			14
15	29.776	65	29.800	61	65	45			64	53																			15
16	29.900	62	29.990	61	65	42			58	55.5																			16
17	30.016	61	29.998	60	58	37			55	47.5																			17
18	29.942	63	29.954	68	67	49			62	55.5																			18
19	29.934	70	29.880	68	74	54			65.5	58																			19
20	29.858	65	29.872	58	70	47			55	49																			20
21	29.838	59	29.670	58	60	39			58.5	54																			21
22	29.684	63	29.502	60	61	41			60.5	51.5																			22
23	29.546	62	29.882	60	65	41			59	51																			23
24	29.936	62	29.888	60	61	40			56	47																			24
25	29.822	64	29.810	62	66	42			61.5	57																			25
26	29.808	61	29.892	62	64	50			57	56																			26
27 (30.154 P.M.)	29.918	67	30.154	64	69	51			62	58																			27
28	30.200	63	29.850	63	70	45			61.5	56.5																			28
29	29.860	69	29.866	66	64	48			59	56.5																			29
30	30.212	69	30.200	66	68	42			60	55																			30
31																													31
Sums.	28.082	1894	28.068	1865	1922	1347			1739	1593																			
Means.	29.936	63.1	29.935	62.2	64.1	44.9			58.0	53.1																			
Corr. for Index Errors.					+0.4	+0.1			−0.1	+0.1																			
Correction for Diurnal Range.‡					64.5	45.0			57.9 −1.9	53.2 −1.9																			
Corrected Means.									56.0	51.3																			
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.), = 29.936
Diameter of tube _____ inch; correction for capillarity to be added, + .018
Sum, 29.918
Correction for Temperature from Column No. 2 to be deducted, = − .093
Sum, 29.825

Column No. 3 (P.M.), = 29.935
Capillarity, = + .018
Sum, 29.917
Temp. from Col. 4, = − .090
Sum, 29.827

Mean of the above 29.826
Correction for Height above Sea-level, _____ feet, to add, .126
Barometer corrected and reduced to 32° and Sea-level, 29.952

Barometer, Highest observed reading of Month, = 30.212 on the 30th
Lowest do. do., = 29.502 on the 22nd
Difference, or Monthly Range, = 0.710

SUMMARY OF THE WINDS.

Direction.	N	NE	E	SE	S	SW	W	NW	Calm or Variable.	Mean Force.
A.M.										
P.M.										

Dry bulb Thermometer (mean of Cols. 9 and 11),* 56.0
Wet bulb Thermometer (mean of Cols. 10 and 12),* 51.3
† Dew-point Temperature, 46.9
† Elastic Force of Vapour, .324
† Weight of Vapour in a Cubic Foot of Air, 3.59
† Additional Weight required to Saturate a Cubic Foot, _____
† Degree of Humidity (Saturation 100), 72

Highest Reading Self-Registering Thermometer in Air and Protected, 74.0 on the 19th
Lowest do. do. do., 37.0 on the 11th & 17th
Difference, being Monthly Range, 37.0
Mean of Self-Registering Thermometers in Air and Protected, 54.8 — 54.4 Mean temp. for entry
Mean Daily Range in Air and Protected, 19.5
Greatest Daily Range, do., 26.0
Highest Reading Self-Registering Black Bulb Thermometer in Sun, _____ on the _____
Lowest do. do. from Radiation during Night, _____ on the _____

* 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.

(Signed) J. D. Gray
(Designation) Student

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.

A

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. The mercury should be 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 for the mercury will strike against 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 reading 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 Hygrometer.—These should be placed alongside of each other, in a place freely exposed to the air, but protected from sunshine, and from reflected heat, as well as from radiation and from rain, and as near as may be *four feet* from the general surface of the ground. The *Self-Registering Thermometers* should be placed exactly with louvre-boarded sides, fixed at a north window, and project-ing 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 louvre-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 washing it may return to the column. These Thermometers, if read once a-day, should *always be read on the evenings*, so that the temperature of the air may be about the 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 mercury or of the nearest the *head of the column* of mercury or of spirit.

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

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

Hygrometer.—The *wet* bulb requires the muslin covering it to be often changed. In towns once a month, or oftener, if the weather is dusty, and the muslin gets foul; the bulb should be covered with thin tissue or blotting paper, below the muslin, and whenever the muslin seems to be foul. The muslin should always be thoroughly wetted, and freed from starch, before being used; and the cotton wick which conducts moisture to it should be previously soaked in a solution of washing soda, and then in pure water, before being attached, in order that it may be thoroughly wetted, else it will conduct the moisture imperfectly, and yield false results. In frosty weather, water must be poured over the wet bulb, so as to form a thin film of ice on the muslin, the evaporation from the ice going on as from the simply wetted bulb.

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

Winds.—Isolated Wind-vanes or Weather-cocks are apt to give false indications of the general direction of the wind, in consequence of the currents of air at the surface of the ground being so much influenced by the neighbourhood of hills, valleys, buildings, etc. Where low clouds are seen drifting along, their direction in reference to known objects, or as noted by means of a mirror on which a compass may be laid, or by means of a circular mirror fixed over the centre of a pocket compass, will, in general, give the true direction of the current of air near the earth's surface if these clouds are near and immediately over head, that is, in or near the zenith of the observer. The motion of the higher strata of clouds gives no such indication. Failing the clouds, the greatest force of the wind during the period of observation. Anemometer, as procured at Messrs Adie and Son's, and enter

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

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

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

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

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OBSERVATIONS IN CONNECTION WITH THE PERIODICAL RETURN OF THE SEASONS.

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

SHRUBS, ETC.	First in Blossom.	FRUITS.	First in Blossom.	Fruit Ripe generally.	MIGRATORY BIRDS.	First Arrival.	Departure.
Barberry,		Apple,			Cuckoo,		
Bourtree or Elder,		Black Currant,			Curlew,		
Broom,		Cherry,			House-Swallow,		
Hazel,		Gean,			Lapwing,		
Hawthorn,		Gooseberry,			Plover,		
Holly,		Peach,			Sand-Martin,		
Laburnum,		Pear,			Starling,		
Lilac,		Plum,			Swan,		
Mezereon,		Strawberry,			Rail or Corn Crake,		
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.

METEOROLOGICAL RETURNS.

EDINBURGH.

[redacted]

Sec.y Meteorological Society,
H. FARK Inde Iwine,
Meteorological office
Sec.,

W
Albyldon
Glen

POSTAGE ONE PENNY
JUL 1859
EDINBURGH

SCOTTISH METEOROLOGICAL SOCIETY.

Observations taken at Aberdeen, County of Aberdeen, in Lat. 57° 9' N, Long 2° 6' W, Height above Sea 115 feet.

Distance from Sea 2 miles. During the MONTH of June 1859.

Phasis of Moon.	Days of Month.	Barometer. ___h. A.M. Barometer. (inches.)	Barometer. ___h. A.M. Attached Thermometer (°)	Barometer. ___h. P.M. Barometer. (inches.)	Barometer. ___h. P.M. Attached Thermometer (°)	Self-Registering Thermometers. Protected. Highest in Air. (°)	Self-Registering Thermometers. Protected. Lowest in Air. (°)	Self-Registering Thermometers. Exposed. Max. Black bulb in Sun. (°)	Self-Registering Thermometers. Exposed. Min. Black bulb during Night. (°)	Hygrometer. ___h. A.M. Dry bulb. (°)	Hygrometer. ___h. A.M. Wet bulb. (°)	Hygrometer. ___h. P.M. Dry bulb. (°)	Hygrometer. ___h. P.M. Wet bulb. (°)	Wind. ___h. A.M. Direction.	Wind. ___h. A.M. Force ††	Wind. ___h. P.M. Direction.	Wind. ___h. P.M. Force ††	Rain. Days on which it fell. (days.)	Rain. Amount. (inches.)	Cloud. 1 to 10	Sunshine. Hours.	Thermometers under Ground. ___h. A.M. 3 inches. (°)	Thermometers under Ground. ___h. A.M. 12 inches. (°)	Thermometers under Ground. ___h. A.M. 22 inches. (°)	Temperature of SPRING or WELL. (°)	Sea. Temperature. (°)	Sea. Density.	Ozone. 0 to 10 A.M.	Ozone. 0 to 10 P.M.	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.
	1													var	0.25	SE	0.25	0		7	7				49								1
	2													NE	4	NE	4	1		9	0				49								2
	3													NE	4	var	4	1		6	7				49.5								3
	4													NE	1	SE	1	0		2	16				49.5								4
	5													SE	4	SE	4	0		3	13				49.5								5
	6													SE	1	SE	1	1		5	7				50							mist	6
	7													S	0.25	S	0.25	0		9	2				50							mist	7
	8													var	0.25	E	1	0		7	7				50.5							mist	8
	9													NE	2.25	NE	2.25	1		10	0				50.5								9
	10													NE	2.25	NE	2.25	0		5	12				50.5								10
	11													SE	4	NE	4	1		6	9				50.5								11
	12													NE	1	SE	0.25	0		6	5				50.5								12
	13													NW	4	NW	4	1		8	8				51								13
	14													NW	4	NW	2.25	1		8	3				51								14
	15													NW	2.25	NW	4	1		8	8				51								15
	16													N	2.25	N	2.25	0		7	7				51								16
	17													var	2.25	var	2.25	0		5	15				51.5							solar halo	17
	18													SW	4	var	2.25	1		4	12				51.5								18
	19													var	1	var	0.25	1		9	3				51.5								19
	20													var	1	var	1	1		8	5				51.5								20
	21													S	4	SW	4	1		7	6				52								21
	22													SW	4	SW	4	1		6	9				52								22
	23													NW	4	NW	4	1		8	9				52								23
	24													NW	2.25	SW	2.25	1		7	7				52								24
	25													SW	4	SW	4	0		6	8				52								25
	26													SW	0.25	SW	1	1		8	4				52							thunder & lightning	26
	27													SW	4	SW	4	0		4	11				52.5								27
	28													var	0.25	var	2.25	1		9	12				52.5								28
	29													SW	2.25	var	0.25	1		3	10				52.5								29
	30													var	2.25	var	0.25	0		2	15				52.5							solar halo	30
	31																																31
Sums.															2 74.25		74.50 74.45	18 18		192 195	227				1531.0 1513								
Means.															2.4		2.5	1.57 1.56		6.4 6.5					51.0 50.4								
Index Errors.																																	
Correction for Diurnal Range.‡																																	
Corrected Means.																																	
No. of Column.		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26		27				

1 mile S of centre of Aberdeen

3 miles SW of centre of old Aberdeen

4½ miles S of Aberdeen the lightning struck a peat mossy, made a hole in it 1½ feet deep and 8 to 10 feet diameter, and threw out out nearly a cart load of peat. From the hole radiated 14 nearly equidistant fissures in the moss 20 to 30 feet long. The fissures ~~when seen~~ appeared like ruts 2 to 3 inches broad & 1 to 2 inches deep. A walking stick could be more easily pushed down through the moss in the line of the fissures & in the hole than in the sound moss around. A man was killed at the same time, 43 yards from where the lightning struck the moss.

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

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

Sum, ... _____

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

Sum, ... _____

Mean of the above ..... _____

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

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

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

Capillarity, ... = + _____

Sum, ... _____

Temp. from Col. 4, ... = − _____

Sum, ... _____

Barometer, Highest observed reading of Month, ... on the _____

Lowest do. do., ... = _____ on the _____

Difference, or Monthly Range, ... = _____

SUMMARY OF THE WINDS.

Direction.	N	NE	E	SE	S	SW	W	NW	Calm or Variable.	Mean Force.	Mean Velocity in miles per day.
A.M.	1	7	0	2	2	6	0	5	7	2.4	
P.M.	1	4	1	5	1	6	0	4	8	2.5	
Mean.	~~1 5½ 1 3½ 1½ 6 0 4½ 7½~~ 1 " 5 " 1 " 3 " 2 " 6 " 0 " 4 " 8									2.4	

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

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

† Dew-point Temperature, ... _____

† Elastic Force of Vapour, ... _____

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

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

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

Highest Reading Self-Registering Thermometer in Air and Protected, ... _____ on the _____

Lowest do. do. do., ... _____ on the _____

Difference, being Monthly Range, ... _____

Mean of Self-Registering Thermometers in Air and Protected, ... _____

Mean Daily Range in Air and Protected, ... _____

Greatest Daily Range, do., ... _____ on the _____

Highest Reading Self-Registering Black Bulb Thermometer in Sun, ... _____ on the _____

Lowest do. do. from Radiation during Night, _____ on the _____

†† In the above columns for the registration of the Force of the Wind, may be entered the *number of revolutions*, by Professor Robinson's Cup Wind Gauge, which registers the velocity of the Wind—540 revolutions being equal to one statute mile.

* If the readings are taken at 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.

(*Signed*) Alex^r Cruickshank

(*Designation*) 12 Rose St Aberdeen

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 being comparable with one another; and for this purpose it is requisite that all should, if possible, observe at a like hour, and in a like manner, and have their instruments placed, in so far as circumstances allow, in a like position:

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

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

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

The corrections necessary to be applied to the Barometric readings depend on the form of the instrument. The mode of making these corrections, and the tables employed for the purpose, will be found in the "Report of the Committee of the Royal Society on Physics and Meteorology," 1840, price 1s. The dailyreadings 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 Hygrometer.—These should be placed alongside of each other, in a place freely exposed to the air, but protected from sunshine, and from reflected heat, as well as from radiation and from rain, and as 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 louvre-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 heat-safe ventilated box, with louvre-boarded sides, fixed in any exposed place, and if possible over grass. Whatever means are finally decided on, the position of the instruments should be mentioned, and should not be changed (without due notice being given to the Secretary), in order that the results of one month's observations may be strictly comparable with those of another.

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

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

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

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

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

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

Clouds.—The Society recommends observers to adopt the Howard nomenclature of clouds. The scale of cloud in the visible sky is reckoned from 0 to 10. Thus, a sky quite free from cloud is 0; a sky half covered with cloud is 5; and the whole visible sky covered with cloud is 10. Clouds often cover three-fourths or even more of the visible sky without obstructing the sunshine, so that the indications noted in the column for clouds would not necessarily express, or agree with, the column for sunshine. As the full moon, *so long as it is above the horizon*, is 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 pitcher, covered with a sloping lid, and with a weight attached, is sunk to the required depth, and in ten minutes drawn up and read. The density of the sea water should, if possible, be taken at the same time. Convenient instruments are furnished by Messrs Adie and Son.

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

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.

Ozone.—Mention whether Schonbein's or Moffat's scale and papers are used. Schonbein's are preferred. They may be had at Messrs Adie and Son's, 50, 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. 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.	Divested of Leaves.	CROPS, mentioning variety.	Sowing or Planting.	Appearing above Ground.	In Ear or Flower.	First Cut or Raised.
Alder,					Barley,			Jun 20	
Ash,					Bere or Bigg,				
Beech,					Oats,			Jun 25	
Birch,					Wheat, ~~Spring~~ autumn			Jun 20	
Elm,					Beans,			Jun 15	
Larch,					Pease,				
Lime,					Potatoes,				
Oak,					Turnips,				
Sycamore or Plane,					Rye Grass,				

SHRUBS, ETC.	First in Blossom.	FRUITS.	First in Blossom.	Fruit Ripe generally.	MIGRATORY BIRDS.	First Arrival.	Departure.
Barberry,		Apple,			Cuckoo,		
Bourtree or Elder,	Jun 24	Black Currant,			Curlew,		
Broom,		Cherry,			House-Swallow,		
Hazel,		Gean,			Lapwing,		
Hawthorn,		Gooseberry,			Plover,		
Holly,		Peach,			Sand-Martin,		
Laburnum,		Pear,			Starling,		
Lilac,		Plum,			Swan,		
Mezereon,		Strawberry,		30 Jun	Rail or Corn Crake,		
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.

METEOROLOGICAL RETURNS.

EDINBURGH.

To

DR STARK,

Sec., Meteorological Society,

21, Rutland St.,

Edinburgh

ABERDEEN JUY 3 1859

P M EDINBURGH JY 4 59

SCOTTISH METEOROLOGICAL SOCIETY.

Observations taken at Aberdeen, County of Aberdeen, in Lat. 57° 9′, Long. 2° 6′ W, Height above Sea 115 feet.

Distance from Sea _____ miles. During the MONTH of July 1859.

Days of Month.	Barometer. 8¾ h. A.M. Barometer.	Barometer. 8¾ h. A.M. Attached Thermometer.	Barometer. 8¾ h. P.M. Barometer.	Barometer. 8¾ h. P.M. Attached Thermometer.	Self-Registering Thermometers. Protected. Highest in Air.	Self-Registering Thermometers. Protected. Lowest in Air.	Self-Registering Thermometers. Exposed. Max. Black bulb in Sun.	Self-Registering Thermometers. Exposed. Min. Black bulb during Night.	Hygrometer. ___ h. A.M. Dry bulb.	Hygrometer. ___ h. A.M. Wet bulb.	Hygrometer. ___ h. P.M. Dry bulb.	Hygrometer. ___ h. P.M. Wet bulb.	Wind. ___ h. A.M. Direction.	Wind. ___ h. A.M. Force	Wind. ___ h. P.M. Direction.	Wind. ___ h. P.M. Force	Rain. Days on which it fell.	Rain. Amount.	Cloud. 1 to 10	Sunshine. Hours.	Thermometers under Ground. ___ h. A.M. 3 inches.	Thermometers under Ground. ___ h. A.M. 12 inches.	Thermometers under Ground. ___ h. A.M. 22 inches.	Temperature of SPRING or WELL.	Temperature of SEA.	Ozone. 0 to 10	Electricity.	General Remarks. As to occurrence of Thunder, Lightning, Storms, Hail, Meteors, Remarkable Depression or Elevation of Barometer, etc. *Mention the hour at which these began and ended.*	Days of Month.
	inches.	°	inches.	°	°	°	°	°	°	°	°	°					days.	inches.			°	°	°	°	°		°		
1	30·234	68	30·212	66	65	43			59·8	52·5																			1
2	30·276	68	30·212	65	63	46			58	53																			2
3	30·200	65	30·150	64	62	44			59	55																			3
4	30·150	64	30·184	65	65	49			59	54																			4
5	30·200	67	30·276	67	68	50			63·3	58·5																			5
6	30·188	64	30·160	67	71	51			60	57																			6
7	30·050	67	30·062	66	64	52			63·5	60·5																			7
8	30·050	67	30·170	68	66	53			64	58																			8
9	30·214	68	30·184	67	71	49			60	53																			9
10	30·170	69	30·100	70	73	52			63	59·5																			10
11	30·100	70	29·850	70	72	53			67·5	62																			11
12	29·900	70	30·126	69	73	53			65	53·5																			12
13	30·120	68	30·226	68	73	47			62	57																			13
14	30·236	67	30·100	68	68	45			60	54·5																			14
15	30·000	67	30·050	69	67	50			65·5	58·5																			15
16	30·050	71	29·850	70	72	52			67·5	59																			16
17	29·850	71	29·900	67	76	51			57·5	55·5																			17
18	29·922	66			59	48			57·5	51·5																			18
19	30·050	67	30·068	67	60	48			57	52																			19
20	30·130	64	30·072	67	61	50			60	56																			20
21	30·072	65	30·044	65	64	53			59·5	58																			21
22	30·014	67	30·000	67	70	51			58	54																			22
23	29·976	65	30·090	66	61	45			58	57																			23
24	30·160	63	30·000	66	58	39			56	50·5																			24
25	29·936	65	29·900	67	68	48			62·5	58																			25
26	29·942	68	29·672	67	73	50			64	59																			26
27	29·684	70	29·850	68	70	54			67·5	58																			27
28	29·820	66	29·950	68	72	52			60·8	56·2																			28
29	29·920	69	30·000	67	72	43			60	52·5																			29
30	29·984	65	29·612	66	68	41			57	52·5																			30
31	29·174	67	29·300	66	69	53			62	59																			31
Sums.	0·772	2078	0·370	2013	2094	1515			1898	1729																			
Means.	30·025	67·0	30·012	67·1	67·5	48·9			61·1	55·8																			
	±	±	±	±	±	±			±	±																			
Index Errors.																													
Correction for Diurnal Range.‡									-1·6	-1·9 ~~-1·3~~																			
Corrected Means.									59·5	~~57·1~~ 53·9																			
No. of Column.	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27		

Barometer, mean corrected reading of Column No. 1 (A.M.), ... = 30·025
Diameter of tube _____ inch; correction for capillarity to be added, ... + ·018
Sum, ... 30·007
Correction for Temperature from Column No. 2 to be deducted, ... = − ·103
Sum, ... 29·904

Column No. 3 (P.M.), ... = 30·012
Capillarity, ... = + ·018
Sum, ... 29·994
Temp. from Col. 4, ... = − ·103
Sum, ... 29·891

Mean of the above ..... 29·898
Correction for Height above Sea-level, _____ feet, to add, ... ·126
Barometer corrected and reduced to 32° and Sea-level, ... 30·024

Barometer, Highest observed reading of Month, ... = 30·276 on the 5th
Lowest do. do., ... = 29·174 on the 31st
Difference, or Monthly Range, ... = 1·102

SUMMARY OF THE WINDS.

Direction.	N	NE	E	SE	S	SW	W	NW	Calm or Variable.	Mean Force.
A.M.										
P.M.										

Dry bulb Thermometer (mean of Cols. 9 and 11),* .....
Wet bulb Thermometer (mean of Cols. 10 and 12),* ..... 59·5 59·5
† Dew-point Temperature, ... 57·1 53·9
† Elastic Force of Vapour, ... 55·0 48·9
† Weight of Vapour in a Cubic Foot of Air, ... ·433 ·347
† Additional Weight required to Saturate a Cubic Foot, ... 4·83 3·92
† Degree of Humidity (Saturation 100), ... 86 72

Highest Reading Self-Registering Thermometer in Air and Protected, ... 76 on the 17th
Lowest do. do. do., ... 39 on the 24th
Difference, being Monthly Range, ... 37
Mean of Self-Registering Thermometers in Air and Protected, ... 58·2 = 2 (FSS·6) 57·5
Mean Daily Range in Air and Protected, ... 18·6
Greatest Daily Range, do., ... 29·0
Highest Reading Self-Registering Black Bulb Thermometer in Sun, ... on the
Lowest do. do. from Radiation during Night, ... on the

* 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.

(*Signed*) _____

(*Designation*) _____

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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 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.

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

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

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

Hygrometer.—The *wet* bulb requires the muslin covering it to be often changed. In towns once a month, or oftener, if the weather is dusty, and the muslin gets foul; in the country, whenever the muslin seems to be foul. The bulb should be covered with thin tissue or blotting paper below the muslin, and the muslin should always be thoroughly wetted, and the cotton wick which conducts moisture to it should be previously soaked in a solution of starch, before being used; and the cotton wick which conducts moisture to it should be previously soaked in a solution of soda, and then in pure water, before being attached, in order that it may be thoroughly wetted, else it will conduct the moisture sluggishly, and yield false results. In frosty weather, water must be poured over the wet bulb, so as to form a thin film of ice on the muslin, the evaporation from the ice going on as from the simply wetted bulb.

Rain Gauge.—As "Fleming's Rain Gauges" seem to possess several advantages over others, the Society gives the preference to them; but whatever form be employed, in order that all the stations may yield comparable results, it is recommended that the Gauge be sunk in the ground, so that the top of the receiver is nearly on a level with the top blades of *close cut grass*, in a place as distant as possible from trees, houses, high walls, and irregular or broken ground, 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, vallers, buildings, etc. Where low clouds are seen drifting along, their direction in reference to known objects, or as noted by means of a mirror on which a compass may be laid, or by means of a circular mirror fixed over the centre of a pocket compass, will, in general, give the true direction of the current of air near the earth's surface if these clouds are near and immediately over head, that is, in or near the zenith of the observer. The motion of the higher strata of clouds gives no such indication. Failing the clouds, the general direction of the smoke of a 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 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 sunshine, so that the indications noted in the column for clouds would not necessarily express, or agree with, the column for sunshine. As the full moon, *so long as it is above the horizon*, is thought by some eminent astronomers to have a powerful effect in dispelling clouds, it would be well to note in the General Remarks any facts bearing on this point, for a few days (or nights, as the case may be) before and after every full moon; and the same observations ought to be made at the periods of new moon.

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

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

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

Ozone.—Mention whether Schonbein's or Moffat's scale and papers are used. Schonbein's are preferred. They may be had at Messrs Adie and Son's, 50, Princes Street, and at Mr Brown'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. 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.	Divested of Leaves.	CROPS, mentioning variety.	Sowing or Planting.	Appearing above Ground.	In Ear or Flower.	First Cut or Raised.
Alder,					Barley,				
Ash,					Bere or Bigg,				
Beech,					Oats,				
Birch,					Wheat,				
Elm,					Beans,				
Larch,					Pease,				
Lime,					Potatoes,				
Oak,					Turnips,				
Sycamore or Plane,					Rye Grass,				

SHRUBS, ETC.	First in Blossom.	FRUITS.	First in Blossom.	Fruit Ripe generally.	MIGRATORY BIRDS.	First Arrival.	Departure.
Barberry,		Apple,			Cuckoo,		
Bourtree or Elder,		Black Currant,			Curlew,		
Broom,		Cherry,			House-Swallow,		
Hazel,		Gean,			Lapwing,		
Hawthorn,		Gooseberry,			Plover,		
Holly,		Peach,			Sand-Martin,		
Laburnum,		Pear,			Starling,		
Lilac,		Plum,			Swan,		
Mezereon,		Strawberry,			Rail or Corn Crake,		
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.

METEOROLOGICAL RETURNS.

Mr J. G. Smith
Sec.y Meteorological Society,
M. Z. Andrew Square
Edinburgh

To

Abroad
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ABERDEEN
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SCOTTISH METEOROLOGICAL SOCIETY.

Observations taken at Aberdeen, County of Aberdeen, in Lat. 57°9'N, Long. 2°6'W, Height above Sea 115 feet.

Distance from Sea 2 miles. During the MONTH of July 1859.

Days of Month.	BAROMETER. ___h. A.M. Barometer. (inches.)	BAROMETER. ___h. A.M. Attached Thermometer (°)	BAROMETER. ___h. P.M. Barometer. (inches.)	BAROMETER. ___h. P.M. Attached Thermometer (°)	SELF-REGISTERING THERMOMETERS. Protected. Highest in Air. (°)	SELF-REGISTERING THERMOMETERS. Protected. Lowest in Air. (°)	SELF-REGISTERING THERMOMETERS. Exposed. Max. Black bulb in Sun. (°)	SELF-REGISTERING THERMOMETERS. Exposed. Min. Black bulb during Night. (°)	HYGROMETER. ___h. A.M. Dry bulb. (°)	HYGROMETER. ___h. A.M. Wet bulb. (°)	HYGROMETER. ___h. P.M. Dry bulb. (°)	HYGROMETER. ___h. P.M. Wet bulb. (°)	WIND. ___h. A.M. Direction.	WIND. ___h. A.M. Force ††	WIND. ___h. P.M. Direction.	WIND. ___h. P.M. Force ††	RAIN. Days on which it fell. (days.)	RAIN. Amount. (inches.)	CLOUD. 1 to 10	SUNSHINE. Hours.	THERMOMETERS. under Ground. ___h. A.M. 3 inches. (°)	THERMOMETERS. under Ground. ___h. A.M. 12 inches. (°)	THERMOMETERS. under Ground. ___h. A.M. 22 inches. (°)	Temperature of SPRING or WELL. (°)	SEA. Temperature. (°)	SEA. Density.	OZONE. 0 to 10 A.M.	OZONE. 0 to 10 P.M.	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.
1													N	2.25	NE	2.25	0		2	16				52.5								1
2													N	2.25	N	2.25	0		3	11				52.5								2
3													NE	2.25	E	2.25	0		3	17				53								3
4													E	1	SE	0.25	0		6	8				53								4
5													var	0.25	var	0.25	1		8	3				53							Thunder, mist	5
6													var	0.25	var	0.25	1		8	3				53							Thunder, lightning, mist	6
7													var	0.25	var	0.25	1		9	3				53								7
8													var	1	NE	0.25	0		7	5				53.5								8
9													S	1	S	2.25	0		3	12				53.5								9
10													SE	2.25	S	2.25	1		6	9				53.5							Thunder	10
11													SW	0.25	SW	9	1		9	2				53.5							Thunder lightning	11
12													NW	4	NW	4	0		3	14				53.5								12
13													SW	0.25	var	0.25	1		9	5				53.5								13
14													SW	1	var	0.25	0		6	12				54								14
15													SW	1	var	0.25	0		5	10				54								15
16													SW	4	W	4	1		7	10				54								16
17													var	0.25	var	0.25	1		10	0				54								17
18													NE	0.25	E	2.25	1		10	0				54								18
19													E	2.25	SE	2.25	1		9	0				54								19
20													SE	1	S	1	1		10	0				54								20
21													SE	2.25	var	2.25	0		4	8				54.5							mist	21
22													var	2.25	var	4	1		6	8				54.5								22
23													NE	2.25	E	2.25	1		9	2				54.5								23
24													SE	2.25	var	2.25	0		4	11				54.5								24
25													SW	1	W	1	1		7	5				55								25
26													SW	1	SW	0.25	1		9	3				55								26
27													NW	4	W	2.25	0		8	9				55								27
28													SW	4	NW	2.25	1		8	5				55								28
29													NW	2.25	var	0.25	1		8	4				55								29
30													SW	2.25	SE	2.25	0		4	12				55							solar halo	30
31													SW	9	SW	9	1		7	7				55							thunder	31
Sums.														59.5		64	18	4.4	207	214				1672								
Means.														1.9		2.1			6.7	7				53.9								
Index Errors.																																
Correction for Diurnal Range.‡																																
Corrected Means.																																
No. of Column.	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27					

Plusis of Moon.

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

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

Sum, ... _____

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

Sum, ... _____

Mean of the above ..... _____

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

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

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

Capillarity, ... = + _____

Sum, ... _____

Temp. from Col. 4, ... = − _____

Sum, ... _____

Barometer, Highest observed reading of Month, ... = _____ on the _____

Lowest do. do., ... = _____ on the _____

Difference, or Monthly Range, ... = _____

SUMMARY OF THE WINDS.

Direction.	N	NE	E	SE	S	SW	W	NW	Calm or Variable.	Mean Force.	Mean Velocity in miles per day.
A.M.	2	3	2	4	1	10	0	3	6	1.8	
P.M.	1	2	3	3	3	3	3	2	11	2.81	
Mean.	1½	2½	2½	3½	2	6½	1½	2½	8½	2.3	
	2	2	2	4	2	6	2	3	8		

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

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

† Dew-point Temperature, ... _____

† Elastic Force of Vapour, ... _____

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

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

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

Highest Reading Self-Registering Thermometer in Air and Protected, ... _____ on the _____

Lowest do. do. do., ... _____ on the _____

Difference, being Monthly Range, ... _____

Mean of Self-Registering Thermometers in Air and Protected, ... _____

Mean Daily Range in Air and Protected, ... _____

Greatest Daily Range, do., ... _____ on the _____

Highest Reading Self-Registering Black Bulb Thermometer in Sun, ... _____ on the _____

Lowest do. do. from Radiation during Night, _____ on the _____

†† In the above columns for the registration of the Force of the Wind, may be entered the *number of revolutions*, by Professor Robinson's Cup Wind Gauge, which registers the velocity of the Wind—540 revolutions being equal to one statute mile.

* If the readings are taken at 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.

(Signed) Alexr Cruickshank

(Designation) 12 Rose St Aberdeen

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.

A

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, 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. If any air has got admittance, it then completely fill the tube. If any air, however, to 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 this 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 Hygrometer.—These should be placed alongside of each other, in a place freely exposed to the air, but protected from sunshine, and from reflected heat, as well as from radiation and from rain, and as near as may be *four feet* from the general surface of the ground. Different contrivances are used for this purpose, either a north window, and project-with louvre-boarded sides, fixed at a north ing 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-louvre-boarded side, 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 guided 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 may return to the column. These Thermometers, if read once a-day, should *always be read on the evenings*, so that the temperatures marked by the floats indicate the minimum and the maximum of the day on which the reading is taken. N.B.—The readings of these instruments are taken from that extremity of the float which is nearest the *head of the column* of mercury or of spirit.

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

The *minimum* Registering Thermometer, for taking the exlowest 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 or raised on wooden supports a few inches above the surface, and removed during the day.

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

Rain Gauge.—As "Fleming's Rain Gauges" seem to possess several advantages over others, the Society gives the preference to them; but whatever form be employed, in order that all the stations may yield comparable results, it is recommended that the Gauge be sunk in the ground, so that the top of the receiver is nearly on a level with the top blades of *close cut grass*, in a place as distant as possible from trees, houses, high walls, and 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.

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

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

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

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

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OBSERVATIONS IN CONNECTION WITH THE PERIODICAL RETURN OF THE SEASONS.

FOREST TREES.	In Flower.	Leaf Buds first appear.	In Leaf.	Divested of Leaves.
Alder,				
Ash,				
Beech,				
Birch,				
Elm,				
Larch,				
Lime,				
Oak,				
Sycamore or Plane,				

CROPS, mentioning variety.	Sowing or Planting.	Appearing above Ground.	In Ear or Flower.	First Cut or Raised.
Barley,				
Bere or Bigg,				
Oats,				
Wheat,				
Beans,				
Pease,				
Potatoes, Summer			July 1 &	July 10
Turnips,				
Rye Grass,				

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

FRUITS.	First in Blossom.	Fruit Ripe generally.
Apple,		
Black Currant,		
Cherry,		July 10
Gean,		
Gooseberry,		
Peach,		July 25
Pear,		
Plum,		
Strawberry,		

MIGRATORY BIRDS.	First Arrival.	Departure.
Cuckoo,		
Curlew,		
House-Swallow,		
Lapwing,		
Plover,		
Sand-Martin,		
Starling,		
Swan,		
Rail or Corn Crake,		
Other Birds, naming them—		

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.

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July

METEOROLOGICAL RETURNS.

EDINBURGH.

To

DR STARK

Meteorologica

Royal Soc.

Edinburgh

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SCOTTISH METEOROLOGICAL SOCIETY.

Observations taken at Aberdeen, County of Aberdeen, in Lat. 57·9 N, Long. 2°·6 W, Height above mean level of Sea 115 feet.

Distance from Sea 1½ miles. During the MONTH of August 1859.

Days of Month.	Barometer. 9h 45m A.M. (Barometer)	Barometer. 9h 45m A.M. (Attached Thermometer)	Barometer. ___h P.M. (Barometer)	Barometer. ___h P.M. (Attached Thermometer)	Self-Registering Thermometers. Protected. Highest in Air.	Self-Registering Thermometers. Protected. Lowest in Air.	Self-Registering Thermometers. Exposed. Max. Black bulb in Sun.	Self-Registering Thermometers. Exposed. Min. Black bulb during Night.	Hygrometer. 9h 45m A.M. Dry bulb.	Hygrometer. 9h 45m A.M. Wet bulb.	Hygrometer. ___h P.M. Dry bulb.	Hygrometer. ___h P.M. Wet bulb.	Wind. ___h A.M. Direction.	Wind. ___h A.M. Force ††	Wind. ___h P.M. Direction.	Wind. ___h P.M. Force ††	Rain. Days on which it fell.	Rain. Amount.	Cloud. 1 to 10	Sunshine. Hours.	Thermometers under Ground. ___h A.M. 3 inches.	Thermometers under Ground. ___h A.M. 12 inches.	Thermometers under Ground. ___h A.M. 22 inches.	Temperature of SPRING or WELL.	Sea. Temperature.	Sea. Density.	Ozone. 0 to 10 A.M.	Ozone. 0 to 10 P.M.	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.
	inches.	°	inches.	°	°	°	°	°	°	°	°	°					days.	inches.			°	°	°	°	°				°		
1	29.350	63	29.600	65	68	47			58.5	52																					1
2	29.750	63	29.782	65	66	46			59	52																					2
3	29.762	63	29.678	64	73	49			61	51.2																					3
4	29.650	65	29.688	65	64	43			58	54																					4
5	29.700	65	29.812	64	68	43			58.5	55																					5
6	29.818	62	29.834	65	67	43			54	51																					6
7	29.834	64	29.894	64	68	45			58.2	51																					7
8	29.912	65	30.000	62	63	40			56	52																					8
9	30.000	65	30.106	62	58	52			58.5	52.5																					9
10	30.118	64	30.118	61	62	39			56	50																					10
11	30.108	68	29.914	62	64	43			60.5	56																					11
12	29.878	63	29.858	62	64	47			59.5	55																					12
13	29.864	66	29.742	60	62	50			61	59																					13
14	29.752	64	29.708	61	68	51			63.5	60.5																					14
15	29.738	66	29.894	62	68	42			59	57.5																					15
16	29.992	63	29.968	60	65	40			60.5	55																					16
17	29.982	71	29.994	70	70	52			70																						17
18	29.964	67	29.932	63	79	56			64	60																					18
19	30.028	63	30.014	61	69	50			56	55																					19
20	30.120	73	30.088	62	62	50			62	57.5																					20
21	30.226	67	30.230	66	67	51			60.5	53.5																					21
22	30.156	70	30.108	59	70	46			64.5	56																					22
23	30.118	70	30.118	70	70	47			61	56.5																					23
24	29.986	71	29.750	70	69	46			64	56.5																					24
25	29.728	71	29.934	68	69	48			65	61																					25
26	29.812	62	29.706	66	69	46																									26
27	29.700	66	29.702	65	62	49			61	57																					27
28	29.896	68	29.816	64	64	43			58.5	53																					28
29	29.486	60	29.100	64	63	46			58.5	54																					29
30	29.012	62	29.134	65	61	46			57.5	51.2																					30
31	29.178	64	29.270	65	62	43			57	50.5																					31
Sums.	25.618	2036	25.492	1982	2054	1438			1807	1584.4																					
Means.	29.826	65.6	29.822	63.9	66.3	46.4			60.0	54.5																					
Corr. for Index Errors.	* -.018																														
Correction for Diurnal Range.‡									-1.1	-1.9																					
Corrected Means.									~~59.7~~ 58.9	~~53.3~~ 52.6																					
No. of Column.	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27				

Barometer, mean corrected reading of Column No. 1 (A.M.), ... = 29·826

~~Diameter of tube ____ inch; correction for capillarity to be added,~~ ..... ~~+~~ −·018

Sum, ... 29·844

Correction for Temperature from Column No. 2 to be deducted, ... = −·099

Sum, ... 29·745

Mean of the above ..... 29·745

Correction for Height above Sea-level, ____ feet, to add, ... ·126

Barometer corrected and reduced to 32° and Sea-level, ... 29·871

Column No. 3 (P.M.), ... = 29·822

Capillarity, ... = +·018

Sum, ... 29·840

Temp. from Col. 4, ... = −·095

Sum, ... 29·745

Barometer, Highest observed reading of Month, ... = 30·230 on the 21st

Lowest do. do., ... = 29·012 on the 30th

Difference, or Monthly Range, ... = 1·218

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

Dry bulb Thermometer (mean of Cols. 9 and 11),* ..... 59·1 58·9

Wet bulb Thermometer (mean of Cols. 10 and 12),* ..... 52·3 52·6

† Dew-point Temperature, ... 45·6 47·0

† Elastic Force of Vapour, ... ·314 ·323

† Weight of Vapour in a Cubic Foot of Air, ... 3·55 3·63

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

† Degree of Humidity (Saturation 100), ... 62 65

Highest Reading Self-Registering Thermometer in Air and Protected, ... 79 on the 18th

Lowest do. do. do., ... 39 on the 10th

Difference, being Monthly Range, ... 40

Mean of Self-Registering Thermometers in Air and Protected, ... 56·4 − 2·4 = 54·0 } 56·6

Mean Daily Range in Air and Protected, ... 19·9

Greatest Daily Range, do., ... 26·0 on the 15

Highest Reading Self-Registering Black Bulb Thermometer in Sun, ... on the

Lowest do. do. from Radiation during Night, ... on the

(Signed) Thomas David Gray

(Designation) Student

†† In the above columns for the registration of the Force of the Wind, may be entered the *number of revolutions*, by Professor Robinson's Cup Wind Gauge, which registers the velocity of the Wind—540 revolutions being equal to one statute mile.

* If the readings are taken at 9h. and 3h., the 9h. readings to be alone taken to account, as the correction for Diurnal Range in Scotland is unknown.

† All these calculated from Glaisher's Hygrometric Tables, Second Edition *only*.

‡ The Diurnal Range for Scotland is as yet unknown.

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

* Index Error and Capillarity in one Sum

A

INSTRUCTIONS FOR MAKING METEOROLOGICAL OBSERVATIONS.

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

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

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

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

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

Self-Registering Thermometers and Hygrometer.—These should be placed alongside of each other, in a place freely exposed to the air, but protected from sunshine, and from reflected heat, as well as from radiation and from rain, and as 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 louvre-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 louvre-boarded sides, fixed in an exposed place, and if possible over grass. Whatever means are finally decided on, the position of the instruments should be mentioned, and should not be changed (without due notice being given to the Secretary), in order that the results of one month's observations may be strictly comparable with those of another.

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

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

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

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

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

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

Clouds.—The Society recommends observers to adopt the Howard nomenclature of clouds. The scale of cloud in the visible sky is reckoned from 0 to 10. Thus, a sky quite free from cloud is 0; a sky half covered with cloud is 5; and the whole visible sky covered with cloud is 10. Clouds often cover three-fourths or even more of the visible sky without obstructing the sunshine, so that the indications noted in the column for clouds would not necessarily express, or agree with, the column for sunshine. As the full moon, *so long as it is above the horizon*, is 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 pitcher, covered with a sloping lid, and with a weight attached, issues to the required depth, and in ten minutes drawn up and read. The density of the sea water should, if possible, be taken at the same time. Convenient instruments are furnished by Messrs Adie and Son.

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

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.

Ozone.—Mention whether Schonbein's or Moffat's scale and papers are used. Schonbein's are preferred. They may be had at Messrs Adie and Son's, 50, 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 arc 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.	Divested of Leaves.
Alder,				
Ash,				
Beech,				
Birch,				
Elm,				
Larch,				
Lime,				
Oak,				
Sycamore or Plane,				

CROPS, mentioning variety.	Sowing or Planting.	Appearing above Ground.	In Ear or Flower.	First Cut or Raised.
Barley,				
Bere or Bigg,				
Oats,				
Wheat,				
Beans,				
Pease,				
Potatoes,				
Turnips,				
Rye Grass,				

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

FRUITS.	First in Blossom.	Fruit Ripe generally.
Apple,		
Black Currant,		
Cherry,		
Gean,		
Gooseberry,		
Peach,		
Pear,		
Plum,		
Strawberry,		

MIGRATORY BIRDS.	First Arrival.	Departure.
Cuckoo,		
Curlew,		
House-Swallow,		
Lapwing,		
Plover,		
Sand-Martin,		
Starling,		
Swan,		
Rail or Corn Crake,		
Other Birds, naming them—		

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.

To
Sec^y Meteorological Society,
M. H. Andrew Square
Edinburgh

Meteorological Report

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U M EDINBURGH SP 5 59

SCOTTISH METEOROLOGICAL SOCIETY.

Observations taken at Aberdeen, County of Aberdeen, in Lat. 57° 9′ N, Long. 2° 6′ W, Height above Sea 115 feet.

Distance from Sea 2 miles. During the MONTH of August 1859.

Phasis of Moon.	Days of Month.	Barometer ___h. A.M. Barometer.	Barometer ___h. A.M. Attached Thermometer	Barometer ___h. P.M. Barometer.	Barometer ___h. P.M. Attached Thermometer	Self-Registering Thermometers. Protected. Highest in Air.	Self-Registering Thermometers. Protected. Lowest in Air.	Self-Registering Thermometers. Exposed. Max. Black bulb in Sun.	Self-Registering Thermometers. Exposed. Min. Black bulb during Night.	Hygrometer. ___h. A.M. Dry bulb.	Hygrometer. ___h. A.M. Wet bulb.	Hygrometer. ___h. P.M. Dry bulb.	Hygrometer. ___h. P.M. Wet bulb.	Wind. ___h. A.M. Direction.	Wind. ___h. A.M. Force ††	Wind. ___h. P.M. Direction.	Wind. ___h. P.M. Force ††	Rain. Days on which it fell.	Rain. Amount.	Cloud. 1 to 10	Sunshine. Hours.	Thermometers under Ground. ___h. A.M. 3 inches.	Thermometers under Ground. ___h. A.M. 12 inches.	Thermometers under Ground. ___h. A.M. 22 inches.	Temperature of SPRING or WELL.	Sea. Temperature.	Sea. Density.	Ozone. 0 to 10 A.M.	Ozone. 0 to 10 P.M.	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.
		inches.	°	inches.	°	°	°	°	°	°	°	°	°					days.	inches.			°	°	°	°	°		A.M.	P.M.	°		
	1													SW	9	SW	4	1		4	10				55.5							1
	2													SW	4	SW	4	0		6	12				55.5							2
	3													SW	4	SW	2.25	1		8	3				55.5							3
	4													SW	4	SW	2.25	0		3	13				55.5							4
	5													SW	4	NW	2.25	1		6	12				55.5							5
	6													SW	2.25	Var	0.25	1		8	3				55.5							6
	7													Var	1	Var	1	0		8	5				55							7
	8													Var	1	Var	1	1		8	5				55							8
	9													Var	2.25	SE	0.25	0		3	13				55							9
	10													SW	4	SW	4	0		3	14				55							10
	11													SW	4	S	4	1		9	9				55							11
	12													SW	2.25	S	4	1		4	6				55							12
	13													SW	4	SW	4	1		8	4				55							13
	14													Var	0.25	SW	1	0		6	6				55							14
	15													Var	0.25	Var	0.25	1		9	9				55					Thunder lightning and hail		15
	16													SW	0.25	SW	0.25	1		9	4				55							16
	17													SW	0.25	SW	0.25	0		7	9				55							17
	18													SW	2.25	SW	0.25	1		9	0				55.5							18
	19													N	0.25	E	0.25	1		10	0				55							19
	20													NW	0.25	Var	0.25	0		3	9				55.5							20
	21													NW	4	SW	2.25	0		4	9				55.5					Solar Halo		21
	22													Var	0.25	SE	0.25	0		1	13				55.5							22
	23													Var	0.25	S	0.25	0		1	12				55.5							23
	24													Var	0.25	Var	0.25	0		2	10				55.5					Silent lightning night		24
	25													Var	0.25	NE	2.25	1		2	8				55.5					Solar Halo Thunder and lightning		25
	26													N	4	Var	0.25	1		10	0				55.5					Thunder and Lightning		26
	27													SW	0.25	Var	0.25	0		8	2				55.5							27
	28													SW	1	SW	2.25	0		5	10				55.5					Aurora Borealis		28
	29													SW	9	SW	4	1		9	2				55.5							29
	30													SW	9	SW	4	1		6	6				55.5							30
	31													W	2.25	W	2.25	1		9	2				55.5							31
	Sums.														80		56 54	17	1.99	186	220				1714.5							
	Means.														~~2.6~~ 2.58		1.74 1.8		Wm Hill 3 mile S of centre of Aberdeen	6.0	7.1				55.3							
	Index Errors.																								Rubislaw Works 1 mile N of centre of Aberdeen							
	Correction for Diurnal Range.‡																		2.1 mile S of centre of Abd	‡												
	Corrected Means.																								Ur Dilkie							
	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		

Between 4 & 5 PM on the very hot day of the 17th July observed a curious cast of the fraction in the land near the Buchan Ness 25 miles distant. The land for a mile inland from the sea changed its height several times. At one time it appeared nearly under the horizon, in the course of a minute or two it rose to twice its ordinary height with a great precipice seaward, gaps were also seen several times in the land at different distances from the sea, & at one time one of these gaps cut off a portion of the land next the sea & formed it into an island.

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

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

Sum, ... _____

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

Sum, ... _____

Mean of the above ..... _____

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

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

Column No. 3 (P.M.), ... = ‡ Mean 2.04

Capillarity, ... = + _____

Sum, ... _____

Temp. from Col. 4, ... = − _____

Sum, ... _____

Barometer, Highest observed reading of Month, ... = _____ on the _____

Lowest do. do., ... = _____ on the _____

Difference, or Monthly Range, ... = _____

SUMMARY OF THE WINDS.

Direction.	N	NE	E	SE	S	SW	W	NW	Calm or Variable.	Mean Force.	Mean Velocity in miles per day.
A.M.	2	0	0	0	0	17	1	2	9	~~2.6~~	2.58
P.M.	0	1	1	2	3	14	1	1	8	~~1.8~~	1.74
Mean.	~~1~~ 1	~~½~~ 0	~~½~~ 1	~~1~~ 2	~~1½~~ 3	~~15½~~ 15½	~~1~~ 1	~~1½~~ 1½	~~8½~~ 8½	~~2.2~~ 2.8	2.16

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

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

† Dew-point Temperature, ... _____

† Elastic Force of Vapour, ... _____

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

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

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

Highest Reading Self-Registering Thermometer in Air and Protected, ... _____ on the _____

Lowest do. do. do., ... _____ on the _____

Difference, being Monthly Range, ... _____

Mean of Self-Registering Thermometers in Air and Protected, ... _____

Mean Daily Range in Air and Protected, ... _____

Greatest Daily Range, do., ... _____ on the _____

Highest Reading Self-Registering Black Bulb Thermometer in Sun, ... _____ on the _____

Lowest do. do. from Radiation during Night, _____ on the _____

†† In the above columns for the registration of the Force of the Wind, may be entered the *number of revolutions*, by Professor Robinson's Cup Wind Gauge, which registers the velocity of the Wind—540 revolutions being equal to one statute mile.

* If the readings are taken at 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.

(Signed) Alex Cruickshank

(Designation) 12 Rose St Aberdeen

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.

A

P.

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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 its 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 Hygrometer.—These should be placed alongside of each other, in a place freely exposed to the air, but protected from sunshine, and from reflected heat, as well as from radiation and from rain, and as 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 louvre-boarded sides, fixed at a north window, or in a double meat-safe, ing 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 ventilated box with louvre-boarded sides, fixed in a free current of air to 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 somewhat elevated, in order that the mercurial column may be forward the float or aided by the force of gravity in pushing forward the index; and in the case of the *minimum* Thermometer, the bulb must be slightly depressed, to prevent a draining of the spirit to the top of the tube, and also that any part raised in vapour may return to the column. These Thermometers, if read once a-day, should *always be read on the evenings*, so that the temperatures marked by the floats indicate the minimum and the maximum of the day on which the reading is taken. N.B.—The readings of these instruments are taken from that extremity of the float which is nearest the *head of the column* of mercury or of spirit.

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

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

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

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

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

Clouds.—The Society recommends observers to adopt the Howard nomenclature of clouds. The scale of cloud in the visible sky is reckoned from 0 to 10. Thus, a sky quite free from cloud is 0; a sky half covered with cloud is 5; and the whole visible sky covered with cloud is 10. Clouds often cover three-fourths or even more of the visible sky without obstructing the sunshine, so that the indications noted in the column for clouds would not necessarily express, or agree with, the column for sunshine. As the full moon, *so long as it is above the horizon*, is 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 pitcher, covered with a sloping lid, and with a weight attached, is sunk to the required depth, and in ten minutes drawn up and read. The density of the sea water should, if possible, be taken at the same time. Convenient instruments are furnished by Messrs Adie and Son.

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

Meteors, Aurora Borealis, 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.

Ozone.—Mention whether Schonbein's or Moffat's scale and papers are used. Schonbein's are preferred. They may be had at Messrs Adie and Son's, 50, 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. 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.	Divested of Leaves.	CROPS, mentioning variety.	Sowing or Planting.	Appearing above Ground.	In Ear or Flower.	First Cut or Raised.
Alder,					Barley,				
Ash,					Bere or Bigg,				
Beech,					Oats,				
Birch,					Wheat,				
Elm,					Beans,				
Larch,					Pease,				
Lime,					Potatoes,				
Oak,					Turnips,				
Sycamore or Plane,					Rye Grass,				

SHRUBS, ETC.	First in Blossom.	FRUITS.	First in Blossom.	Fruit Ripe generally.	MIGRATORY BIRDS.	First Arrival.	Departure.
Barberry,		Apple,			Cuckoo,		
Bourtree or Elder,		Black Currant,			Curlew,		
Broom,		Cherry,			House-Swallow,		
Hazel,		Gean,			Lapwing,		
Hawthorn,		Gooseberry,			Plover,		
Holly,		Peach,			Sand-Martin,		
Laburnum,		Pear,			Starling,		
Lilac,		Plum,			Swan,		
Mezereon,		Strawberry,			Rail or Corn Crake,		
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.

General & steady cutting of grain crops began 20th Aug.
The first barley cut 1st Aug
Field potatoe stems began to blacken & smell in 1st week of Aug

METEOROLOGICAL RETURNS.

EDINBURGH.

To

~~DR STARK~~, Mrs Q Green

Secy., Meteorological Society,
10 St Andrew Square
~~St Andrews Sqre~~
Edinburgh

POSTAGE ONE PENNY
EDINBURGH SEP 2 1879

SCOTTISH METEOROLOGICAL SOCIETY.

Observations taken at Aberdeen, County of Aberdeen, in Lat. 57°9'N Long. 2°6'W, Height above Sea 115 feet.

Distance from Sea 2 miles. During the MONTH of September 1859.

Days of Month.	Barometer ___h. A.M. Barometer. (inches.)	Barometer ___h. A.M. Attached Thermometer (°)	Barometer ___h. P.M. Barometer. (inches.)	Barometer ___h. P.M. Attached Thermometer (°)	Self-Registering Thermometers. Protected. Highest in Air. (°)	Self-Registering Thermometers. Protected. Lowest in Air. (°)	Self-Registering Thermometers. Exposed. Max. Black bulb in Sun. (°)	Self-Registering Thermometers. Exposed. Min. Black bulb during Night. (°)	Hygrometer ___h. A.M. Dry bulb. (°)	Hygrometer ___h. A.M. Wet bulb. (°)	Hygrometer ___h. P.M. Dry bulb. (°)	Hygrometer ___h. P.M. Wet bulb. (°)	Wind ___h. A.M. Direction.	Wind ___h. A.M. Force ††	Wind ___h. P.M. Direction.	Wind ___h. P.M. Force ††	Rain. Days on which it fell. (days.)	Rain. Amount. (inches.)	Cloud. 1 to 10	Sunshine. Hours.	Thermometers under Ground ___h. A.M. 3 inches. (°)	Thermometers under Ground ___h. A.M. 12 inches. (°)	Thermometers under Ground ___h. A.M. 22 inches. (°)	Temperature of Spring or Well. (°)	Sea. Temperature. (°)	Sea. Density.	Ozone. 0 to 10 A.M.	Ozone. 0 to 10 P.M.	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.
1													NW	2.25	W	2.25	1		8	3				55.5							1
2													SW	1	W	0.25	1		7	5				55						aurora bor	2
3													SW	2.25	W	2.25	1		6	7				55						aurora bor	3
4													[illegible]	2.25	var	2.25	1		8	6				55						aurora bor	4
5													SW	2.25	SE	4	0		5	8				55						solar halo	5
6													SE	4	S	2.25	1		8	2				55							6
7													NW	0.25	var	0.25	1		6	6				55							7
8													SW	1	var	0.25	1		7	7				55.5							8
9													SW	9	NW	9	1		8	3				55.5							9
10													NW	4	NW	2.25	1		8	5				55.5							10
11													NW	0.25	N	1	1		8	4				55.5							11
12													SW	1	S	0.25	0		7	5				55.5							12
13													SW	1	SE	4	0		7	6				54							13
14													SW	1	NE	0.25	0		8	4				54							14
15													NE	1	E	1	1		7	5				54							15
16													E	1	E	1	1		7	8				54							16
17													N	0.25	var	0.25	0		3	5				54							17
18													SW	2.25	SW	2.25	1		9	1				54							18
19													NW	1	SW	0.25	1		7	5				54.5						lunar halo	19
20													SW	0.25	SW	2.25	0		8	3				54						lunar halo	20
21													SW	0.25	W	0.25	0		5	11				54							21
22													NW	2.25	NW	4	0		8	8				54						solar halo	22
23													SW	0.25	SW	1	0		8	2				54							23
24													SW	4	SW	2.25	1		9	0				53						aurora bor	24
25													SW	1	SW	1	1		8	2				53						thunder, aurora bor	25
26													SW	4	SW	4	1		7	5				53							26
27													SW	2.25	SW	1	0		4	8				53						aurora bor	27
28													S	4	S	4	1		9	0				53							28
29													S	4	SW	2.25	1		7	5				53							29
30													SW	2.25	SW	2.25	0		7	5				53							30
31																															31
Sums.														65		59.5	21		216	144				1623.5							
Means.														2.08		~~2~~ 1.98	3.15		7.2	[illegible]				[illegible]							
Index Errors.																								54.1							
Correction for Diurnal Range.‡																															
Corrected Means.																															
No. of Column.	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27				

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

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

Sum,..... _____

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

Sum,..... _____

Mean of the above ..... _____

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

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

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

Capillarity,.....= + _____

Sum,..... _____

Temp. from Col. 4, a.....= — _____

Sum,..... _____

Barometer, Highest observed reading of Month,.....= _____ on the _____

Lowest do. do.,.....= _____ on the _____

Difference, or Monthly Range, ...= _____

SUMMARY OF THE WINDS.

Direction.	N	NE	E	SE	S	SW	W	NW	Calm or Variable.	Mean Force.	Mean Velocity in miles per day.
A.M.	21	1	1	2	17	0	6	0		2.08	
P.M.	1	1	2	2	3	10	3	4	~~3~~	~~2~~ 1.98	
Mean.	~~1½~~ 1	~~½~~ 1	~~½~~ 2	~~1½~~ 2	~~2½~~ 2	~~13½~~ 13	~~2½~~ 2	~~5~~ 5	~~1½~~ 2	2.03	

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

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

† Dew-point Temperature, _____

† Elastic Force of Vapour, _____

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

† Additional Weight required to Saturate a Cubic Foot, _____

† Degree of Humidity (Saturation 100), _____

Highest Reading Self-Registering Thermometer in Air and Protected, ... 1" 3" 13" 2" 5" 2 on the _____

Lowest do. do. do., ... _____ on the _____

Difference, being Monthly Range, _____

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

Mean Daily Range in Air and Protected, _____

Greatest Daily Range, do., _____ on the _____

Highest Reading Self-Registering Black Bulb Thermometer in Sun, _____ on the _____

Lowest do. do. from Radiation during Night, _____ on the _____

†† In the above columns for the registration of the Force of the Wind, may be entered the *number of revolutions*, by Professor Robinson's Cup Wind Gauge, which registers the velocity of the Wind—540 revolutions being equal to one statute mile.

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Clouds.—The Society recommends observers to adopt the Howard nomenclature of clouds. The scale of cloud in the visible sky is reckoned from 0 to 10. Thus, a sky quite free from cloud is 0; a sky half covered with cloud is 5; and the whole visible sky covered with cloud is 10. Clouds often cover three-fourths of 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.

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Thermometer under Grass.—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 whether the *kind* of soil; whether drained or undrained; whether naturally wet or dry.

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

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Meteors, Aurora Borealis, Remarkable Falls of Rain, Hail or Snow, Thunder 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.

Ozone.—Mention whether Schonbein's or Moffat's scale and papers are used. Schonbein's are preferred. They may be had at Messrs Adie and Son's, 50, 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. 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.	Divested of Leaves.	CROPS, mentioning variety.	Sowing or Planting.	Appearing above Ground.	In Ear or Flower.	First Cut or Raised.
Alder,					Barley,				
Ash,					Bere or Bigg,				
Beech,					Oats,				
Birch,					Wheat,				
Elm,					Beans,				
Larch,					Pease,				
Lime,					Potatoes,				
Oak,					Turnips,				
Sycamore or Plane,					Rye Grass,				

SHRUBS, ETC.	First in Blossom.	FRUITS.	First in Blossom.	Fruit Ripe generally.	MIGRATORY BIRDS.	First Arrival.	Departure.
Barberry,		Apple,			Cuckoo,		
Bourtree or Elder,		Black Currant,			Curlew,		
Broom,		Cherry,			House-Swallow,		
Hazel,		Gean,			Lapwing,		
Hawthorn,		Gooseberry,			Plover,		
Holly,		Peach,			Sand-Martin,		
Laburnum,		Pear,			Starling,		
Lilac,		Plum,			Swan,		
Mezereon,		Strawberry,			Rail or Corn Crake,		
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.

The bulk of the grain crop was stacked during 1st week of Sep.
& all of the rest by 15th Sep. Grain crops about ¼ under average.
Potato crop good but ⅓d of the crop show marks of disease
Turnip crop is ⅓d under average
Hay crop is only ⅓ of an average

To
[illegible] PK,
[illegible] Meteorological Society,
21, Rutland Street,
EDINBURGH.

ONE PENNY

[illegible] 1859

[illegible] 1859

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~~Hygrometer Observations omitted as they have evidently not been taken at 9½ AM~~. The time of observation ought to be carefully entered

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SCOTTISH METEOROLOGICAL SOCIETY.

Observations taken at Aberdeen, County of Aberdeen, in Lat. _____, Long. _____, Height above Sea _____ feet.

Distance from Sea _____ miles. During the MONTH of October 1859.

Days of Month.	BAROMETER. ___h. A.M. Barometer.	Attached Thermometer	___h. P.M. Barometer.	Attached Thermometer	SELF-REGISTERING THERMOMETERS. Protected. Highest in Air.	Lowest in Air.	Exposed. Max. Black bulb in Sun.	Min. Black bulb during Night.	HYGROMETER. ___h. A.M. Dry bulb.	Wet bulb.	___h. P.M. Dry bulb.	Wet bulb.	WIND. ___h. A.M. Direction.	Force ††	___h. P.M. Direction.	Force ††	RAIN. Days on which it fell.	Amount.	CLOUD. 1 to 10	SUNSHINE. Hours.	THERMOMETERS. under Ground. ___h. A.M. 3 inches.	12 inches.	22 inches.	Temperature of SPRING or WELL.	SEA. Temperature.	Density.	OZONE. 0 to 10 A.M.	P.M.	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.
	inches.	°	inches.	°	°	°	°	°	°	°	°	°					days.	inches.			°	°	°	°	°				°		
1	29.650	57	29.650	59	62	32			57.8	51																					1
2	29.900	58	29.874	60	55	42			49.2	47																					2
3	29.884	64	29.830	61	60.5	45			60.5	58.5																					3
4	29.780	61	29.798	59	64	49			55.5	55																					4
5	29.774	60	29.950	60	60	45			55.5	50																					5
6	29.962	64	29.978	61	59	42			57	55																					6
7	29.980	59	29.896	57	61.5	44			56	55																					7
8	29.948	57	29.970	56	58	49			55.5	55																					8
9	29.954	58	29.966	55	57	49			53.5	53																					9
10	29.968	55	29.900	55	58	48			55	53																					10
11	29.842	56	29.600	56	56	41			54	52																					11
12	29.598	57	29.800	58	55	45			54	53.5																					12
13	29.820	58	29.828	60	55	37			54	54																					13
14	29.750	59	29.640	60	55	44			54.5	53.5																					14
15	29.610	57	29.606	58	57	47			56.5	54.5																					15
16	29.560	59	29.548	59	57	46			53	52																					16
17	29.740	58	30.050	59	55	46			57.5	50.5																					17
18	30.052	57	29.826	53	53	42			44	43.5																					18
19	29.790	55	29.500	55	51.8	30			41.8	40																					19
20	29.500	54	29.280	45	51	31.2			40	38.2																					20
21	29.250	45	29.284	43	42.5	28			32	31																					21
22	29.250	46	29.276	41	35	21			28																						22
23	29.190	42	29.274	42	34	19			33.5	32																					23
24	29.282	44	29.342	42	37	27			36	35																					24
25	29.400	45	29.500		37	23			34.5																						25
26	29.120	46	29.005	48	40	23			38	37.5																					26
27	29.310	46	29.310	45	42	31			41.2	37.5																					27
28	29.520	45	28.884	47	43	28			38.5	37																					28
29	29.800	48	29.170	44	46	32			41	40.5																					29
30	29.280	48	29.234	45	43.5	28			37.7	35.5																					30
31	29.200	46	28.646	44	40	21			33.5	32.5																					31
Sums.	15.664	1663	15.385	1532	1587	1172																									
Means.	29.634	53.6	29.551	52.9	51.0	36.5			46.7	46.4																					
Index Errors.	*-.018		-.018																												
Correction for Diurnal Range.‡																															
Corrected Means.	29.616		29.533																												
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.), ... = _____

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

Sum, ... 29.616 584

Correction for Temperature from Column No. 2 to be deducted, ... = − .066

Sum, ... 29.550 518

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

Capillarity,* ..... = + _____

Sum, ... 29.533 543

Temp. from Col. 4, ... = − .065

Sum, ... 29.468

Mean of the above 29.509

Correction for Height above Sea-level, _____ feet, to add, ... .126

Barometer corrected and reduced to 32° and Sea-level, ... 29.635

Barometer, Highest observed reading of Month, ... = 30.052 on the 18th

Lowest do. do., ... = 28.646 on the 31st

Difference, or Monthly Range, ... = 1.406

SUMMARY OF THE WINDS.

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

Dry bulb Thermometer (mean of Cols. 9 and 11),* ..... 46.7 ..... 46.7

Wet bulb Thermometer (mean of Cols. 10 and 12),* ..... 46.4 ..... 45.7

† Dew-point Temperature, ... 46.1 ..... 44.0

† Elastic Force of Vapour, ... .312 ..... .288

† Weight of Vapour in a Cubic Foot of Air, ... 3.28

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

† Degree of Humidity (Saturation 100), ... 98 91

Highest Reading Self-Registering Thermometer in Air and Protected, ... 62.0 on the 1st

Lowest do. do. do., ... 19.0 on the 23d

Difference, being Monthly Range, ... 43.0

Mean of Self-Registering Thermometers in Air and Protected, ... 43.8 ~~1.5 = 42.0 } 44.6~~

Mean Daily Range in Air and Protected, ... 14.5

Greatest Daily Range, do., ... 30.0 on the 1st

Highest Reading Self-Registering Black Bulb Thermometer in Sun, ... _____ on the _____

Lowest do. do. from Radiation during Night, _____ on the _____

(Signed) Thomas D. Gray.

(Designation) Student

†† In the above columns for the registration of the Force of the Wind, may be entered the *number of revolutions*, by Professor Robinson's Cup Wind Gauge, which registers the velocity of the Wind—540 revolutions being equal to one statute mile.

* If the readings are taken at 9h and 3h, the 9h readings to be alone taken to account, as the correction for Diurnal Range in Scotland is unknown.

† All these calculated from Glaisher's Hygrometric Tables, Second Edition *only*.

‡ The Diurnal Range for Scotland is as yet unknown.

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

* Index error and Capillarity in one sum

A 2

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 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 the 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 Barometer 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.—These should be freely exposed to

Self-Registering Thermometers and Hygrometer.—These should be placed exactly 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 louvre-boarded sides, fixed in an exposed place, or in a double decided on, the position of the instruments should be mounted in an open window, and projected and should not be changed (without due notice being given to the Secretary), in order that the results of one month's observations may be strictly comparable with those of another.

The *Self-Registering Thermometers* should be placed exactly horizontal. In the case of the ordinary *maximum* Thermometer, with clay, glass, or steel index, the bulb may be *very slightly* elevated, in order that the mercurial column may be somewhat aided by the force of gravity in pushing forward the float or index; and in the case of the *minimum* Thermometer, the bulb must be slightly depressed, to prevent a draining of the spirit to the top of the tube, and also that any part raised in vapour may return to the column. These Thermometers, if read once a-day, should *always be read on the evenings*, so that the temperature 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 mounted. It should be laid out, about sunset, over grass, in a place freely exposed to the sky, but raised on wooden supports a few inches above the surface, and removed during the day.

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

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Birch,					Wheat,				
Elm,					Beans,				
Larch,					Pease,				
Lime,					Potatoes,				
Oak,					Turnips,				
Sycamore or Plane,					Rye Grass,				

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Barberry,		Apple,			Cuckoo,		
Bourtree or Elder,		Black Currant,			Curlew,		
Broom,		Cherry,			House-Swallow,		
Hazel,		Gean,			Lapwing,		
Hawthorn,		Gooseberry,			Plover,		
Holly,		Peach,			Sand-Martin,		
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Lilac,		Plum,			Swan,		
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Whin,							

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METEOROLOGICAL RETURNS.

To

DR STARK,

Sec., Meteorological Society,

21, Rutland Street,

EDINBURGH.

U M
EDINBURGH
NO 3
59

No Signature — time of observation not stated

SCOTTISH METEOROLOGICAL SOCIETY.

Observations taken at Aberdeen, County of Aberdeen, in Lat. 57° 9′ N, Long. 2° 6′ W, Height above Sea 115 feet.

Distance from Sea 2 miles. During the MONTH of October 1859.

Days of Month.	Barometer. ___h. A.M. Barometer. (inches.)	Barometer. ___h. A.M. Attached Thermometer (°)	Barometer. ___h. P.M. Barometer. (inches.)	Barometer. ___h. P.M. Attached Thermometer (°)	Self-Registering Thermometers. Protected. Highest in Air (°)	Self-Registering Thermometers. Protected. Lowest in Air (°)	Self-Registering Thermometers. Exposed. Max. Black bulb in Sun (°)	Self-Registering Thermometers. Exposed. Min. Black bulb during Night (°)	Hygrometer. ___h. A.M. Dry bulb. (°)	Hygrometer. ___h. A.M. Wet bulb. (°)	Hygrometer. ___h. P.M. Dry bulb. (°)	Hygrometer. ___h. P.M. Wet bulb. (°)	Wind. ___h. A.M. Direction.	Wind. ___h. A.M. Force ††	Wind. ___h. P.M. Direction.	Wind. ___h. P.M. Force ††	Rain. Days on which it fell. (days.)	Rain. Amount. (inches.)	Cloud. 1 to 10	Sunshine. Hours.	Thermometers under Ground. ___h. A.M. 3 inches. (°)	Thermometers under Ground. ___h. A.M. 12 inches. (°)	Thermometers under Ground. ___h. A.M. 22 inches. (°)	Temperature of SPRING or WELL. (°)	Sea. Temperature. (°)	Sea. Density.	Ozone. 0 to 10 A.M.	Ozone. 0 to 10 P.M.	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.
1													SE	4	SW	1	0		10	3				53						Mist Aurora Borealis	1
2													SW	0.25	S	0.25	0		10	3				53							2
3													SW	2.25	SW	2.25	0		7	4				53							3
4													SW	0.25	SW	0.25	0		9	3				53							4
5													SW	~~2.25~~	W	2.25	0		3	7				53						Aurora Borealis	5
6													SW	1	SW	1	0		3	7				53							6
7													SE	4	SE	4	0		8	2				52.5							7
8													SE	0.25	SE	1	1		10	0				52.5							8
9													SE	2.25	S	2.25	1		10	0				52.5							9
10													SE	4	S.E	4	1		9	0				52.5							10
11													SE	4	SE	4	1		9	3				52.5							11
12													N	2.25	NW	1	1		9	2				52.5							12
13													SW	0.25	SW	0.25	1		1	0				52.5							13
14													SE	2.25	SE	2.25	0		9	1				52.5							14
15													SE	1	SE	1	0		9	3				52.5						—	15
16													N	2.25	E	2.25	1		10	3				52.5							16
17													NE	4	NE	2.25	1		9	0				52.5							17
18													N	2.25	NW	1	0		9	2				52.5							18
19													SW	0.25	NW	2.25	1		2	8				52						Aurora Borealis	19
20													NW	4	N	4	0		8	2				52						Hail Snow Aurora Borealis	20
21													NW	4	NW	4	0		8	3				52						Snow	21
22													W	1	NW	1	1		8	4				52						Snow Aurora Borealis	22
23													W	0.25	NW	0.25	1		7	4				52						Snow Sleet	23
24													NW	4	NW	4	1		8	1				52						Snow	24
25													W	0.25	NW	0.25	0		2	7				51.5							25
26													NE	4	NW	16	1		10	0				51							26
27													W	4	Var.	2.25	1		9	0				50.5						Aurora Borealis	27
28													N	2.25	NE	9	1		10	0				50.5						Lightening Thunder.	28
29													NW	4	NW	9	1		9	1				50						Sleet Aurora Borealis	29
30													NW	4	NW	1	0		2	8				50							30
31													W	0.25	Var.	0.25	0		3	7				50						Solar Halo	31
Sums.														72.75		86.5 ~~1175~~	16	7.00	230	88				1613.5						Ground about Abdn white with Snow on six days from 20th to 25th inclusive Snow Two to Three inches deep The frost of the 21st killed garden plants such as Dalias On the 19th a flock of 30 Partridges was seen in Marischal College Court in the centre of Abdn early in the morning Trees began to be denuded of their leaves during first week of October and were almost all bare by the fourth week except Willow	
Means.														2.35		2.79 ~~3.13~~		4 Fourth or Lower Fall	7.4					52.0							
Index Errors.																															
Correction for Diurnal Range.‡																															
Corrected Means.																															
No. of Column.	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27				

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

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

Sum, ... _____

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

Sum, ... _____

Mean of the above ..... _____

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

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

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

Capillarity, ... = + _____

Sum, ... _____

Temp. from Col. 4, ... = − _____

Sum, ... _____

Barometer, Highest observed reading of Month, ... = _____ on the _____

Lowest do. do., ... = _____ on the _____

Difference, or Monthly Range, ... = _____

SUMMARY OF THE WINDS.

Direction.	N	NE	E	SE	S	SW	W	NW	Calm or Variable.	Mean Force.	Mean Velocity in miles per day.
A.M.	4	2	0	8	0	7	5	5	0	2.35	
P.M.	1	2	2	5	2	5	1	11	2	2.79	
Mean.	~~1½~~ 2	2	1	6½ 7	1	6	3	8	1	~~2.9~~ 2.57	= 2.57 lbs

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

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

† Dew-point Temperature, ... _____

† Elastic Force of Vapour, ... _____

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

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

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

Highest Reading Self-Registering Thermometer in Air and Protected, ... _____ on the _____

Lowest do. do. do., ... _____ on the _____

Difference, being Monthly Range, ... _____

Mean of Self-Registering Thermometers in Air and Protected, ... _____

Mean Daily Range in Air and Protected, ... _____

Greatest Daily Range, do., ... _____ on the _____

Highest Reading Self-Registering Black Bulb Thermometer in Sun, ... _____ on the _____

Lowest do. do. from Radiation during Night, _____ on the _____

(*Signed*) _____

(*Designation*) _____

†† In the above columns for the registration of the Force of the Wind, may be entered the *number of revolutions*, by Professor Robinson's Cup Wind Gauge, which registers the velocity of the Wind—540 revolutions being equal to one statute mile.

* If the readings are taken at 9h. and 3h., the 9h. readings to be alone taken to account, as the correction for Diurnal Range in Scotland is unknown.

† All these calculated from Glaisher's Hygrometric Tables, Second Edition *only*.

‡ The Diurnal Range for Scotland is as yet unknown.

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

Patent lightning reported to have been seen on 6 nights during the month

A

P

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 should be read 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. If any air has got admittance, it should be driven into the cistern by reversing the instrument, and then completely fill the tube. If it cannot be thus expelled, 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 body of the person, are apt to influence its readings.

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

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

Clouds.—The Society recommends observers to adopt the Howard nomenclature of clouds. The scale of cloud in the visible sky is reckoned from 0 to 10. Thus, a sky quite free from cloud is 0; a sky half covered with cloud is 5; and the whole visible sky covered with cloud is 10. Clouds often cover three-fourths or even more of the visible sky without obstructing the sunshine, so that the indications noted in the column for clouds would not necessarily express, or agree with, the column for sunshine. As the full moon, *so long as it is above the horizon*, is 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 pitcher, covered with a sloping lid, and with a weight attached, is sunk to the required depth, and in ten minutes drawn up and read. The density of the sea water should, if possible, be taken at the same time. Convenient instruments are furnished by Messrs Adie and Son.

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

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.

Ozone.—Mention whether Schonbein's or Moffat's scale and papers are used. Schonbein's are preferred. They may be had at Messrs Adie and Son's, 50, 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. Excited glass or sealing-wax ascertains the nature of the electricity.

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

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

OBSERVATIONS IN CONNECTION WITH THE PERIODICAL RETURN OF THE SEASONS.

FOREST TREES.	In Flower.	Leaf Buds first appear.	In Leaf.	Divested of Leaves.
Alder,				
Ash,				
Beech,				
Birch,				
Elm,				
Larch,				
Lime,				
Oak,				
Sycamore or Plane,				

CROPS, mentioning variety.	Sowing or Planting.	Appearing above Ground.	In Ear or Flower.	First Cut or Raised.
Barley,				
Bere or Bigg,				
Oats,				
Wheat,				
Beans,				
Pease,				
Potatoes,				
Turnips,				
Rye Grass,				

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

FRUITS.	First in Blossom.	Fruit Ripe generally.
Apple,		
Black Currant,		
Cherry,		
Gean,		
Gooseberry,		
Peach,		
Pear,		
Plum,		
Strawberry,		

MIGRATORY BIRDS.	First Arrival.	Departure.
Cuckoo,		
Curlew,		
House-Swallow,		
Lapwing,		
Plover,		
Sand-Martin,		
Starling,		
Swan,		
Rail or Corn Crake,		
Other Birds, naming them—		

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.

To

~~MR. STARK,~~ Mr A. M. Bunyon

Sec., Meteorological Society,

10 St Andrew-Square

~~21 Dublin Street~~

EDINBURGH.

METEOROLOGICAL RETURNS.

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135

SCOTTISH METEOROLOGICAL SOCIETY.

Observations taken at Aberdeen, County of Aberdeen, in Lat. 57.9 N., Long. 2°.6 W., Height above mean level of Sea 115 feet.

Distance from Sea 1½ miles. During the MONTH of November 1859.

Phasis of Moon.	Days of Month.	BAROMETER. 8¾ h. A.M. Barometer.	Attached Thermometer	9 h. P.M. Barometer.	Attached Thermometer	SELF-REGISTERING THERMOMETERS. Protected. Highest in Air.	Lowest in Air.	Exposed. Max. Black bulb in Sun.	Min. Black bulb during Night.	HYGROMETER. 8¾ h. A.M. Dry bulb.	Wet bulb.	P.M. Dry bulb.	Wet bulb.	WIND. A.M. Direction.	Force ††	P.M. Direction.	Force ††	RAIN. Days on which it fell.	Amount.	CLOUD. 1 to 10	SUNSHINE. Hours.	THERMOMETERS. under Ground. A.M. 3 inches.	12 inches.	22 inches.	Temperature of SPRING or WELL.	SEA. Temperature.	Density.	OZONE. 0 to 10 A.M.	P.M.	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.
		inches.	°	inches.	°	°	°	°	°	°	°	°	°					days.	inches.			°	°	°	°	°				°		
	1	28.536	46	29.444	44	45	26			44.5	43																					1
	2	29.500	47	29.424	45	45	29			39	38.5																					2
	3	29.384	48	29.356	45	42.5	30			41.5	41																					3
	4	29.280	44	28.824	48	44	30			40	39																					4
	5	28.984	55	28.750	47	45.5	35			44.5	44																					5
	6	28.800	50	28.908	51	47	31			47.5	46																					6
	7	29.022	50	29.330	45	50	30			38.5	38																					7
	8	29.372	46	29.864	45	44.5	29			39.5	39																					8
	9	30.250	44	30.570	44	42.5	28.5			35	33																					9
	10	30.650	43	30.578	42	37	29			36.2	34																					10
09	11	30.484	41	30.330	42	43	26			36.1	34																					11
	12	30.212	42	30.164	43	46	31			41	39.5																					12
	13	30.192	48	30.234	44	45	34			45	44																					13
	14	30.266	43	30.298	45	48	29			39.5	38.5																					14
	15	200		220		43	30			44.5	43																					15
	16	30.360	52	30.340	50	45	34			44	42																					16
	17	200		100																												17
	18	29.866	48	29.938	49	45.5	35			45.5	44.5																					18
	19	30.000	48	30.016	46	48.5	36			42	40																					19
	20	29.940	47	29.780	47	44.5	31			44.5	43.5																					20
	21	29.620	45	29.558	45	46	37.5			45	43.5																					21
	22	29.746	47	29.960	48	45	35			44	41																					22
	23	30.066	50	30.080	46	40.5	27			36	35																					23
	24	30.096	49	30.082	49	46.5	27			46.5	45.5																					24
	25	30.054	49	29.866	49	47	38			46.5	45																					25
	26	29.738	47	29.416	49	47	39			46	44.5																					26
	27	29.592	50	29.722	48	47	37			44.5	41.5																					27
	28	29.682	44	29.560	45	46	27			36	34																					28
	29	29.600	44	29.642	43	39.5	27			37.5	36.5																					29
	30	29.600	42	620		38	27			36.5	36																					30
	31																															31
	Sums.	20.886	1309	21.604	1242	1340	905.0			1206.8	1167.0																					
	Means.	29.746	46.7	29.778	46.0	44.6	31.2			41.6	40.2																					
	Index Errors.	*-.018		-.018		+.4	-.4			-.1	+.1																					
	Correction for Diurnal Range.‡									41.5 ~~40.8~~	40.3 ~~40.7~~																					
	Corrected Means.	29.728		29.760		45.0	30.8			~~42.3~~	~~41.0~~																					
	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				

+ 552 / 322 / 874 / 158 / 716 24

554 / 454

726

Barometer, mean corrected reading of Column No. 1 (A.M.), ... = 29.728

Diameter of tube ____ inch; correction for capillarity* to be added, ... + 763

Sum, ...

Correction for Temperature from Column No. 2 to be deducted, ... = − .049

Sum, ... 29.679 / 714

Mean of the above 29.696

Correction for Height above Sea-level, ____ feet, to add, ... 126

Barometer corrected and reduced to 32° and Sea-level, ... 29.822

Column No. 3 (P.M.), ... = 29.760

Capillarity,* ..... = + 784

Sum, ...

Temp. from Col. 4, ... = − .046

Sum, ... 29.714 / 736

Barometer, Highest observed reading of Month, ... = 30.650 on the 10th

Lowest do. do., ... = 28.536 on the 1st

Difference, or Monthly Range, ... = 2.114

SUMMARY OF THE WINDS.

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

Dry bulb Thermometer (mean of Cols. 9 and 11),* ..... ~~42.3~~ 41.5

Wet bulb Thermometer (mean of Cols. 10 and 12),* ..... ~~41.0~~ 40.3

† Dew-point Temperature, ... ~~39.4~~ 38.8

† Elastic Force of Vapour, ... ~~.248~~ .237

† Weight of Vapour in a Cubic Foot of Air, ... ~~2.77~~ 2.74

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

† Degree of Humidity (Saturation 100), ... ~~90~~ 91

Highest Reading Self-Registering Thermometer in Air and Protected, ... 50.0 on the 7th

Lowest do. do. do., ... 26.0 on the 1st

Difference, being Monthly Range, ... 24.0

Mean of Self-Registering Thermometers in Air and Protected, ... 37.9 ~~+0 = 36.9 3 39.0~~

Mean Daily Range in Air and Protected, ... 14.2

Greatest Daily Range, do., ... 20.0 on the 7th

Highest Reading Self-Registering Black Bulb Thermometer in Sun, ... on the

Lowest do. do. from Radiation during Night, ... on the

†† In the above columns for the registration of the Force of the Wind, may be entered the *number of revolutions*, by Professor Robinson's Cup Wind Gauge, which registers the velocity of the Wind—540 revolutions being equal to one statute mile.

* If the readings are taken at 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.

(*Signed*) Thomas David Gray

(*Designation*) Student

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.

* Correction for index error and Capillarity in one Sum.

A

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

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

Barometer.—Barometers of Messrs Adie and Son's construction are recommended; but any instruments may be used which have adjustable surfaces, and have been compared. Before this instrument is suspended for use it should be examined, in order to ascertain whether the space above the mercury is free from air. This is done by inclining the instrument somewhat from the vertical position, when, if free from air, the mercury will strike against the upper end of the tube with a sharp tap. The mercury should then completely fill the tube. If any air has got admittance, it should be driven into the 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 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 results.

Self-Registering Thermometers and Hygrometer.—These should be placed alongside of each other, in a place freely exposed to the air, but protected from sunshine, and from reflected heat, as well as from radiation and from rain, and as 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 louvre-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 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.

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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.

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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.

Ozone.—Mention whether Schonbein's or Moffat's scale and papers are used. Schonbein's are preferred. They may be had at Messrs Adie and Son's, 50, 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. 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.	Divested of Leaves.	CROPS, mentioning variety.	Sowing or Planting.	Appearing above Ground.	In Ear or Flower.	First Cut or Raised.
Alder,					Barley,				
Ash,					Bere or Bigg,				
Beech,					Oats,				
Birch,					Wheat,				
Elm,					Beans,				
Larch,					Pease,				
Lime,					Potatoes,				
Oak,					Turnips,				
Sycamore or Plane,					Rye Grass,				

SHRUBS, ETC.	First in Blossom.	FRUITS.	First in Blossom.	Fruit Ripe generally.	MIGRATORY BIRDS.	First Arrival.	Departure.
Barberry,		Apple,			Cuckoo,		
Bourtree or Elder,		Black Currant,			Curlew,		
Broom,		Cherry,			House-Swallow,		
Hazel,		Gean,			Lapwing,		
Hawthorn,		Gooseberry,			Plover,		
Holly,		Peach,			Sand-Martin,		
Laburnum,		Pear,			Starling,		
Lilac,		Plum,			Swan,		
Mezereon,		Strawberry,			Rail or Corn Crake,		
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.

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To

The A. H. Burgess
[illegible]

Sec., Meteorological Society,

10 St. Andrews [illegible], [illegible]

EDINBURGH.

Aberdeen
Mar 59

METEOROLOGICAL RETURNS.

H.M. EDINBURGH DE 3 59

ABERDEEN 22 DEC 1859 P.

Observers name not signed, nor hours of observation stated — the handwriting different from former schedules

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SCOTTISH METEOROLOGICAL SOCIETY.

Observations taken at Aberdeen, County of Aberdeen, in Lat. 57° 9′ N Long. 2° 6′ W, Height above Sea 115 feet.

Distance from Sea 2 miles. During the MONTH of November 1859.

Days of Month	Barometer ___h. A.M. Barometer (inches)	Barometer ___h. A.M. Attached Thermometer (°)	Barometer ___h. P.M. Barometer (inches)	Barometer ___h. P.M. Attached Thermometer (°)	Self-Registering Thermometers Protected Highest in Air (°)	Self-Registering Thermometers Protected Lowest in Air (°)	Self-Registering Thermometers Exposed Max. Black bulb in Sun (°)	Self-Registering Thermometers Exposed Min. Black bulb during Night (°)	Hygrometer ___h. A.M. Dry bulb (°)	Hygrometer ___h. A.M. Wet bulb (°)	Hygrometer ___h. P.M. Dry bulb (°)	Hygrometer ___h. P.M. Wet bulb (°)	Wind ___h. A.M. Direction	Wind ___h. A.M. Force ††	Wind ___h. P.M. Direction	Wind ___h. P.M. Force ††	Rain Days on which it fell (days)	Rain Amount (inches)	Cloud 1 to 10	Sunshine Hours	Thermometers under Ground ___h. A.M. 3 inches (°)	12 inches (°)	22 inches (°)	Temperature of SPRING or WELL (°)	Sea Temperature (°)	Sea Density	Ozone A.M. 0 to 10	Ozone P.M. 0 to 10	Electricity (°)	General Remarks, As to occurrence of Thunder, Lightning, Storms, Hail, Meteors, Remarkable Depression or Elevation of Barometer, etc. *Mention the hour at which these began and ended.*	Days of Month
1													NW	9	NW	4	1		6	4				49.5							1
2													SW	1	SW	1	0		3	8				49.5						Sol. Halo	2
3													SW	1	SW	2.25	1		5	7				49.5						Aurora Borealis	3
4													SW	2.25	SW	2.25	1		6	4				49						Mist	4
5													W	1	W	1	1		4	6				49							5
6													SW	4	SW	4	1		10	1				49							6
7													SW	1	SW	1	1		5	3				49							7
8													NW	1	NW	2.25	1		9	1				48.5						Sleet Snow	8
9													NW	1	NW	1	1		9	0				48.5						Lunar Halo Snow	9
10													SW	0.25	SW	0.25	0		4	3				48.5						Solar Halo. Lunar Halo ~~Snow~~	10
11													SW	0.25	SW	0.25	0		6	4				48.5							11
12													SW	1	SW	1	0		7	2				48.5							12
13													SW	1	SW	1	0		2	4				48						Aurora Borealis	13
14													SW	1	SW	1	0		3	5				48						Aurora Borealis	14
15													SW	1	SW	1	1		4	4				48							15
16													SE	0.25	SE	0.25	1		6	2				48							16
17													SE	0.25	SE	0.25	0		5	2				48							17
18													SE	0.25	SE	1	1		4	3				47.5						Aurora Borealis	18
19													SE	1	SE	1	1		10	1				47.5							19
20													SE	1	SE	2.25	1		10	0				47.5							20
21													SE	2.25	SE	4	0		4	4				47.5							21
22													SE	1	SE	2.25	0		6	2				47.5							22
23													SE	1	SE	1	0		2	6				47							23
24													SE	2.25	SE	2.25	1		10	0				47							24
25													SW	2.25	SW	4	1		10	0				47							25
26													SW	2.25	SW	4	1		10	0				47							26
27													NW	4	NW	2.25	0		2	6				47							27
28													SW	1	SW	1	0		4	5				46.5							28
29													NW	2.25	NW	4	1		10	0				46.5						Snow Sleet	29
30													NW	4	NW	4	1		9	1				46.5						Snow Sleet	30
31																															31
Sums.														~~60.75~~ ~~61.75~~		56.75	17 ~~11~~		5 ~~188~~	88				239 ~~1249~~							
Means.														1.69 ~~2.0~~		1.89			6.2	~~2.2~~				48.0 ~~46.6~~							
Index Errors.																															
Correction for Diurnal Range.‡																															
Corrected Means.																															
No. of Column.	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25		26		27		

Barometer, mean corrected reading of Column No. 1 (A.M.),.....= _____ Column No. 3 (P.M.),.....= _____ Barometer, Highest observed reading of Month,.....= _____ on the _____

Diameter of tube_____inch; correction for capillarity to be added,.....+ _____ Capillarity,.....=+ _____ Lowest do. do.,.....= _____ on the _____

Sum,..... _____ Sum,..... _____ Difference, or Monthly Range,.....= _____

Correction for Temperature from Column No. 2 to be deducted,.....= − _____ Temp. from Col. 4,.....= − _____

Sum,..... _____ Sum,..... _____

Mean of the above ..... _____

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

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

SUMMARY OF THE WINDS.

Direction.	N	NE	E	SE	S	SW	W	NW	Calm or Variable.	Mean Force.	Mean Velocity in miles per day.
A.M.	0	0	0	9	0	14	1	6	2.0	1.69	
P.M.	0	0	0	9	0	14	1	6	~~1.8~~	1.89	
Mean.	0	0	0	9	0	14	1	6	~~1.9~~	1.79	

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

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

† Dew-point Temperature,..... _____

† Elastic Force of Vapour,..... _____

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

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

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

[redacted]

Reading Self-Registering Thermometer in Air and Protected, ... _____ on the _____

do. do. do., ... _____ on the _____

ce, being Monthly Range,..... _____

Self-Registering Thermometers in Air and Protected, ... _____

aily Range in Air and Protected, ... _____

Greatest Daily Range, do., ... _____ on the _____

Highest Reading Self-Registering Black Bulb Thermometer in Sun, ... _____ on the _____

Lowest do. do. from Radiation during Night, _____ on the _____

(*Signed*) _____

(*Designation*) _____

†† In the above columns for the registration of the Force of the Wind, may be entered the *number of revolutions*, by Professor Robinson's Cup Wind Gauge, which registers the velocity of the Wind—540 revolutions being equal to one statute mile.

* If the readings are taken at 9h. and 3h., the 9h. readings to be alone taken to account, as the correction for Diurnal Range in Scotland is unknown.

† All these calculated from Glaisher's Hygrometric Tables, Second Edition *only*.

‡ The Diurnal Range for Scotland is as yet unknown.

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

A

INSTRUCTIONS FOR MAKING METEOROLOGICAL OBSERVATIONS.

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Ozone.—Mention whether Schonbein's or Moffat's scale and papers are used. Schonbein's are preferred. They may be had at Messrs Adie and Son's, 50, 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. 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.	Divested of Leaves.	CROPS, mentioning variety.	Sowing or Planting.	Appearing above Ground.	In Ear or Flower.	First Cut or Raised.
Alder,					Barley,				
Ash,					Bere or Bigg,				
Beech,					Oats,				
Birch,					Wheat,				
Elm,					Beans,				
Larch,					Pease,				
Lime,					Potatoes,				
Oak,					Turnips,				
Sycamore or Plane,					Rye Grass,				

SHRUBS, ETC.	First in Blossom.	FRUITS.	First in Blossom.	Fruit Ripe generally.	MIGRATORY BIRDS.	First Arrival.	Departure.
Barberry,		Apple,			Cuckoo,		
Bourtree or Elder,		Black Currant,			Curlew,		
Broom,		Cherry,			House-Swallow,		
Hazel,		Gean,			Lapwing,		
Hawthorn,		Gooseberry,			Plover,		
Holly,		Peach,			Sand-Martin,		
Laburnum,		Pear,			Starling,		
Lilac,		Plum,			Swan,		
Mezereon,		Strawberry,			Rail or Corn Crake,		
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.

METEOROLOGICAL RETURNS.

EDINBURGH.

To

[redacted]

Sec., Meteorological Society,
10 St Andrews Square.
~~21, Buchanan Street~~

Aberdeen

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SCOTTISH METEOROLOGICAL SOCIETY.

Observations taken at Aberdeen, County of Aberdeen, in Lat. 57°.9'N, Long. 2°.6'W., Height above Mean level of Sea 115 feet.

Distance from Sea 1½ miles. During the MONTH of December 1859.

Days of Month.	Barometer. 8¾ h. A.M.	Attached Thermometer	Barometer. 9 h. P.M.	Attached Thermometer	Self-Registering Thermometers. Protected. Highest in Air.	Lowest in Air.	Exposed. Max. Black bulb in Sun.	Min. Black bulb during Night.	Hygrometer. 8¾ h. A.M. Dry bulb.	Wet bulb.	___ h. P.M. Dry bulb.	Wet bulb.	Wind. ___ h. A.M. Direction.	Force ††	___ h. P.M. Direction.	Force ††	Rain. Days on which it fell.	Amount.	Cloud. 1 to 10	Sunshine. Hours.	Thermometers under Ground. ___ h. A.M. 3 inches.	12 inches.	22 inches.	Temperature of SPRING or WELL.	Sea. Temperature.	Density.	Ozone. 0 to 10 A.M.	P.M.	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.
	inches.	°	inches.	°	°	°	°	°	°	°	°	°					days.	inches.			°	°	°	°	°				°		
1	29.990	43	30.100	44	33	30			35.5	35																					1
2	30.126	43	30.170	42	38	27																									2
3	30.088	41	29.500	38	38	23			32.5	32																					3
4	29.146	41	28.688	40	41	27			41	39.7																					4
5	28.700	46	29.168	42	49	32			39	38.5																					5
6	29.200	41	29.304	40	40	29			37	35																					6
7	29.468	40	30.008	41	41	27			38	36																					7
8	30.190	45	30.480	41	45	31			44	42.2																					8
9	30.580	48	30.600	46	46	38			45.2	43																					9
10	30.630	46	30.482	45	49	38			44	43																					10
11	30.372	45	30.282	49	44	36			42	41																					11
12	260		30.200		46	25			32	32.5																					12
13	30.150	43	160		46	25			32	32.5																					13
14	30.028	36	30.088	37	33	19			24																						14
15	29.930	35	29.756	38	29	20			32.5	30.5																					15
16	29.622	37	29.630	37	32.5	20			32.5	32.5																					16
17	29.650	37	29.660	37	28.5	19.5			28.5																						17
18	29.600	37	29.832	32	32.5	19			32.5	30.5																					18
19	29.496	29.5	29.200	33	29	7			18	19																					19
20	29.180	35	28.750	45	34	26			32.5	34																					20
21	28.692	39	29.182	40	35.5				35.5	34																					21
22	29.226	40	29.400	40	38	29			35.8	34																					22
23	29.434	40	300		32	28			35	34																					23
24	28.984	41	28.946	46	41	24			37.5	37																					24
25	28.962	43	28.902	50	40	26		348	37.8	34.5																					25
26	29.050	48	29.302	52	41	29			40	39.5																					26
27	29.070	50	28.988		42	32			39.5	39																					27
28	29.128	47		45	41	25			37.5	37																					28
29	28.987	45	28.962	47	44	31			38.2	37.5																					29
30	28.972	47	28.970	50	41	27			39.5	39																					30
31	29.352	48	29.380	48	42	29			38	37.5																					31
Sums.	16.003	56.5	15.810	65	1212	798.5			1021.5	995.5																					
Means.	29.533	41.9	29.568	42.3	39.1	26.6			36.5	35.7																					
Index Errors.	* -.018		-.018		+0.4	+0.1			-0.1	+0.1																					
Correction for Diurnal Range.‡																															
Corrected Means.	29.515		29.550		39.5	26.7			36.4	35.8																					
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				

— 640
288
— 908
32
876

Barometer, mean corrected reading of Column No. 1 (A.M.), ... = 29.515 Column No. 3 (P.M.), ... = 29.550 Barometer, Highest observed reading of Month, ... = 30.630 on the 10th

Diameter of tube ____ inch; correction for capillarity* to be added, ... + ____ Capillarity, ... = + ____ Lowest do. do., ... = 28.688 on the 4th

Sum, ... Sum, ... Difference, or Monthly Range, ... = 1.942

Correction for Temperature from Column No. 2 to be deducted, ... = — .037 Temp. from Col. 4, ... = — .037

Sum, ... 29.478 Sum, ... 29.513

Mean of the above 29.496

Correction for Height above Sea-level, ____ feet, to add, ... 126

Barometer corrected and reduced to 32° and Sea-level, ... 29.622

SUMMARY OF THE WINDS.

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

Dry bulb Thermometer (mean of Cols. 9 and 11),* 36.4

Wet bulb Thermometer (mean of Cols. 10 and 12),* 35.8

† Dew-point Temperature, ... 35.0

† Elastic Force of Vapour, ... .204

† Weight of Vapour in a Cubic Foot of Air, ... 2.46

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

† Degree of Humidity (Saturation 100), ... 95

Highest Reading Self-Registering Thermometer in Air and Protected, ... 49.0 on the 5th & 10th

Lowest do. do. do., ... 7.0 on the 19th

Difference, being Monthly Range, ... 42.0

Mean of Self-Registering Thermometers in Air and Protected, ... 33.1

Mean Daily Range in Air and Protected, ... 12.8

Greatest Daily Range, do., ... 22.0 on the 19th

Highest Reading Self-Registering Black Bulb Thermometer in Sun, ... on the

Lowest do. do. from Radiation during Night, ... on the

(Signed) Thomas David Gray

(Designation) Student.

†† In the above columns for the registration of the Force of the Wind, may be entered the *number of revolutions*, by Professor Robinson's Cup Wind Gauge, which registers the velocity of the Wind—540 revolutions being equal to one statute mile.

* If the readings are taken at 9h and 3h, the 9h readings to be alone taken to account, as the correction for Diurnal Range in Scotland is unknown.

† All these calculated from Glaisher's Hygrometric Tables, Second Edition *only*.

‡ The Diurnal Range for Scotland is as yet unknown.

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

* Correction for Index error and capillarity in one sum

INSTRUCTIONS FOR MAKING METEOROLOGICAL OBSERVATIONS.

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

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

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

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

Self-Registering Thermometers and Hygrometer.—These should be placed alongside of each other, in a place freely exposed to the air, but protected from sunshine, and from reflected heat, as well as from radiation and from rain, and as near as may be *four feet* from the general surface of the ground. Different contrivances are used for this purpose, either a double or a window, and project-with louvre-boarded sides, fixed at a north window, and project-ing 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 louvre-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 so high as to prevent access to it during the heat of the day.

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

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

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

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

Clouds.—The Society recommends observers to adopt the Howard nomenclature of clouds. The scale of cloud in the visible sky is reckoned from 0 to 10. Thus, a sky quite free from cloud is 0; a sky half covered with cloud is 5; and the whole visible sky covered with cloud is 10. Clouds often cover three-fourths or even more of the visible sky without obstructing the sunshine, so that the indications noted in the column for clouds would not necessarily express, or agree with, the column for sunshine. As the full moon, *so long as it is above the horizon*, is 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 pitcher, covered with a sloping lid, and with a weight attached, sunk to the required depth, and in ten minutes drawn up and read. The density of the sea water should, if possible, be taken at the same time. Convenient instruments are furnished by Messrs Adie and Son.

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

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.

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OBSERVATIONS IN CONNECTION WITH THE PERIODICAL RETURN OF THE SEASONS.

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

SHRUBS, ETC.	First in Blossom.	FRUITS.	First in Blossom.	Fruit Ripe generally.	MIGRATORY BIRDS.	First Arrival.	Departure.
Barberry,		Apple,			Cuckoo,		
Bourtree or Elder,		Black Currant,			Curlew,		
Broom,		Cherry,			House-Swallow,		
Hazel,		Gean,			Lapwing,		
Hawthorn,		Gooseberry,			Plover,		
Holly,		Peach,			Sand-Martin,		
Laburnum,		Pear,			Starling,		
Lilac,		Plum,			Swan,		
Mezereon,		Strawberry,			Rail or Corn Crake,		
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.

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To

~~DR STARK,~~ – Bunsen Esq.

Secy. Meteorological Society,

~~10 St Andrew's Square, 21, Rutland Street,~~

EDINBURGH.

Meteorological Soc. 1/9

METEOROLOGICAL RETURNS.

UNION STEAM EDINBURGH JA 4 60

SCOTTISH METEOROLOGICAL SOCIETY.

Observations taken at Aberdeen, County of Aberdeen, in Lat. 57° 9′ N, Long. 2° 6′, Height above Sea 115 feet.

Distance from Sea 2 miles. During the MONTH of December 1859.

Days of Week.	Days of Month.	BAROMETER. ___h. A.M. Barometer. (inches.)	Barometer. ___h. A.M. Attached Thermometer. (°)	Barometer. ___h. P.M. Barometer. (inches.)	Barometer. ___h. P.M. Attached Thermometer. (°)	SELF-REGISTERING THERMOMETERS. Protected. Highest in Air. (°)	Protected. Lowest in Air. (°)	Exposed. Max. Black bulb in Sun. (°)	Exposed. Min. Black bulb during Night. (°)	HYGROMETER. ___h. A.M. Dry bulb. (°)	___h. A.M. Wet bulb. (°)	___h. P.M. Dry bulb. (°)	___h. P.M. Wet bulb. (°)	WIND. ___h. A.M. Direction.	___h. A.M. Force	___h. P.M. Direction.	___h. P.M. Force	RAIN. Days on which it fell. (days.)	Amount. (inches.)	CLOUD. 1 to 10	SUNSHINE. Hours.	THERMOMETERS. under Ground. ___h. A.M. 3 inches. (°)	12 inches. (°)	22 inches. (°)	Temperature of SPRING or WELL. (°)	Temperature of SEA. (°)	OZONE. 0 to 10	ELECTRICITY. (°)	GENERAL REMARKS. As to occurrence of Thunder, Lightning, Storms, Hail, Meteors, Remarkable Depression or Elevation of Barometer, etc. *Mention the hour at which these began and ended.*	Days of Month.
	1													N	4	NW	2.25	1		8	2				46.5				Snow Sleet	1
	2													NW	1	NW	1	1		6	3				46.5				Snow	2
	3													SW	1	SW	9	0		3	4				46.5					3
	4													SW	0.25	SW	9	1		9	0				46.5					4
	5													SW	2.25	W	4	1		9	0				46				Met Solar Halo	5
	6													SW	4	SW	2.25	1		7	3				46					6
	7													SW	4	SW	2.25	1		4	4				46					7
	8													S	4	S	9	1		10	0				46					8
	9													S	4	S	4	1		10	0				46					9
	10													SW	4	SW	4	1		10	0				46					10
	11													SW	0.25	SW	0.25	1		9	1				46					11
	12													N	1	NW	1	0		8	0				45.5				Solar Halo	12
	13													NW	4	NW	4	0		9	0				45.5				Snow	13
	14													N	4	NW	4	0		8	2				45.5				Snow Aurora Borealis	14
	15													NW	4	NW	2.25	0		7	3				45.5				Snow Aurora Borealis	15
	16													NW	2.25	NW	4	0		5	4				45.5				Snow	16
	17													NE	1	N	1	0		4	5				45.5				Snow	17
	18													NW	1	NW	0.25	0		5	4				45				Snow Hail	18
	19													SW	1	SW	1	0		8	2				45				Snow	19
	20													SW	1	SW	4	0		9	0				45				Snow	20
	21													NW	4	NW	4	1		8	1				45					21
	22													NW	4	NW	4	0		8	2				45				Snow	22
	23													NW	0.25	N	1	0		7	3				45				Hail	23
	24													SE	9	SW	4	1		10	0				44.5				Snow	24
	25													Var	0.25	Var	0.25	1		10	0				44.5					25
	26													NE	2.25	NE	4	1		10	0				44.5					26
	27													NE	1	NE	1	0		10	0				44.5				Aurora Borealis	27
	28													E	2.25	SE	1	1		9	0				44.5					28
	29													SW	1	SW	1	0		7	3				44					29
	30													SW	4	SW	4	1		7	4				44					30
	31													SW	0.25	SW	0.25	1		8	2				44				Aurora Borealis Solar Halo	31
Sums.															46.25		93	17	2.47	242	48				1415.5					
Means.															2.4		3.0			7.8					45.6					
Index Errors.																														
Correction for Diurnal Range.‡																														
Corrected Means.																														
No. of Column.		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27		

Barometer, mean corrected reading of Column No. 1 (A.M.), ... = _____ Column No. 3 (P.M.), ... = _____ Barometer, Highest observed reading of Month, ... = _____ on the _____

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

Sum, ... Sum, ... Difference, or Monthly Range, ... = _____

Correction for Temperature from Column No. 2 to be deducted, ... = − _____ Temp. from Col. 4, ... = − _____

Sum, ... Sum, ... _____

Mean of the above ..... _____

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

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

SUMMARY OF THE WINDS.

Direction.	N	NE	E	SE	S	SW	W	NW	Calm or Variable.	Mean Force.
A.M.	3	3	1	1	2	12	0	8	1	2.66
P.M.	2	2	0	1	2	12	1	10	1	3.00
	~~2½~~ 2	~~2½~~ 2	~~½~~ 1	~~1~~ 1	~~2~~ 2	~~12~~ 12	~~1~~ 1	~~9~~ 9	~~1~~ 1	~~2.73~~ 2.83 lb.

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

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

† Dew-point Temperature, ... _____

† Elastic Force of Vapour, ... _____

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

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

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

[redacted]

Highest Reading Self-Registering Thermometer in Air and Protected, ... _____ on the _____

Lowest do. do. do., ... _____ on the _____

Range, being Monthly Range, ... _____

Self-Registering Thermometers in Air and Protected, ... _____

Daily Range in Air and Protected, ... _____

Greatest Daily Range, do., ... _____

Highest Reading Self-Registering Black Bulb Thermometer in Sun, ... _____ on the _____

Lowest do. do. from Radiation during Night, _____ on the _____

* 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.

(Signed) Alexr Bruckshank

(Designation) 12 Rose St Aberdeen

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.

This schedule entirely from my own notes except amount of rain & temp of spring
I have mislaid the last schedule for this year & have been obliged to copy my notes on one I had remaining of a former year
AB

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 should 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. In air, the mercury will strike against the instrument is useless till repaired.

The Barometer should be hung 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 Hygrometer.—These should be placed alongside of each other, in a place freely exposed to the air, but protected from sunshine, and from reflected heat, as well as from radiation and from rain, 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 louvre-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, so that the temperatures marked *always be read on the evenings*, so that the minimum and the maximum of the day by the floats indicate the minimum that that extremity of the float which is on which the reading is taken. N.B.—The readings of these instruments are taken from that end 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, at 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 a muslin covering it to be often changed. In towns once a month, or oftener, if the weather is dusty, and the muslin gets foul; in the country whenever the muslin seems to be foul. The bulb should be covered with thin tissue or blotting paper below the muslin, and the muslin should always be thoroughly wetted, and freed from starch, before being used; and the cotton wick which conducts moisture to it should be previously soaked in a solution of washing soda, and then in pure water, before being attached, in order that it may be thoroughly wetted, else it will conduct the moisture imperfectly, and yield false results. In frosty weather, water must be poured over the wet bulb, so as to form a thin film of ice on the muslin, the evaporation from the ice going on as from the simply wetted bulb.

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

Winds.—Isolated Wind-vanes or Weather-cocks are apt to give false indications of the general direction of the wind, in consequence of the currents of air at the surface of the ground being so much influenced by the neighbourhood of hills, valleys, buildings, etc. Where low clouds are seen drifting along, their direction in reference to known objects, or as noted by means of a mirror on which a compass may be laid, or by means of a circular mirror fixed over the centre of a pocket compass, will, in general, give the true direction of the current of air near the earth's surface if these clouds are near and immediately over head, that is, near the zenith of the observer. The motion of the higher 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 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 sunshine, so that the indications noted in the column for clouds would not necessarily express, or agree with, the column for sunshine. As the full moon, *so long as it is above the horizon*, is thought by some eminent astronomers to have a powerful effect in dispelling clouds, it would be well to note in the General Remarks any facts bearing on this point, for a few days (or nights, as the case may be) before and after every full moon; and the same observations ought to be made at the periods of new moon.

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

Thermometers under Ground.—Though the temperature and hygrometric conditions of the air are those which chiefly influence the growth of crops, it is important for the health of the crop, and for the germination of the seed, that the soil itself should have a certain temperature. To collect facts which may illustrate this, it is recommended to have Thermometers sunk 3, 12, and 22 inches below the surface of the ground, to ascertain the temperature of 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 influence of river water, and as near as may be about the time of high water. A Thermometer, with its bulb fixed in a small tin pitcher, covered with a sloping lid, and with a weight attached, is sunk to the required depth, and in ten minutes drawn up and read. Convenient instruments are furnished by Messrs Adie and Son.

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

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

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

Ozone.—Mention whether Schonbein's or Moffat's scale and papers are used. Schonbein's are preferred. They may be had at Messrs Adie and Son's, 50, 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. 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.	Divested of Leaves.	CROPS, mentioning variety.	Sowing or Planting.	Appearing above Ground.	In Ear or Flower.	First Cut or Raised.
Alder,					Barley,				
Ash,					Bere or Bigg,				
Beech,					Oats,				
Birch,					Wheat,				
Elm,					Beans,				
Larch,					Pease,				
Lime,					Potatoes,				
Oak,					Turnips,				
Sycamore or Plane,					Rye Grass,				

SHRUBS, ETC.	First in Blossom.	FRUITS.	First in Blossom.	Fruit Ripe generally.	MIGRATORY BIRDS.	First Arrival.	Departure.
Barberry,		Apple,			Cuckoo,		
Bourtree or Elder,		Black Currant,			Curlew,		
Broom,		Cherry,			House-Swallow,		
Hazel,		Gean,			Lapwing,		
Hawthorn,		Gooseberry,			Plover,		
Holly,		Peach,			Sand-Martin,		
Laburnum,		Pear,			Starling,		
Lilac,		Plum,			Swan,		
Mezereon,		Strawberry,			Rail or Corn Crake,		
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.

C M
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