

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 1/2 miles. During the MONTH of January 1857.

Days of Week.	Days of Month.	BAROMETER.		SELF-REGISTERING THERMOMETERS.				HYGROMETER.				WIND.				RAIN.		CLOUD.	SUNSHINE.	THERMOMETERS under Ground.		Temperature of Spring or Well.	Temperature of Sea.	OZONE.	ELECTRICITY.	GENERAL REMARKS, As to occurrence of Thunder, Lightning, Storms, Hail, Meteors, Remarkable Depression or Elevation of Barometer, etc. <i>Mention the hour at which these began and ended.</i>		
		8-45 h. A.M.		h. P.M.		Max. in Air.	Min. in Air.	Max. Black bulb in Sun.	Min. Black bulb over Grass.	h. A.M.		h. P.M.		h. A.M.		h. A.M.												
		Barometer.	Attach- ed Ther- mometer	Barometer.	Attach- ed Ther- mometer					Dry bulb.	Wet bulb.	Dry bulb.	Wet bulb.	Direction.	Mean Force 1-6.	Direction.	Mean Force 1-6.			Days on which it fell.	Amount.						3 inches.	12 inches.
1		29.600	48			49	38			45	42.5																	
2		29.100	42			48	35			39	37																	
3		29.184	42			44	32			37	36																	
4		29.660	41			43	29			32																		
5		30.260	36			33	25			29.5	28.5																	
6		30.368	35			34	26			34	32																	
7		30.250	37.5			35	30			35	32																	
8		29.800	37			35.5	29			35.5	34																	
9		29.650	44			43	31			43	42																	
10		29.228	48			50	40			45	42.5																	
11		29.070	47			45	33			36	35.5																	
12		29.100	44			41	27			31																		
13		29.270	42			36.5	25			36.5	34																	
14		29.960	40			39	28			33	32																	
15		29.732	43			40	27			40	38																	
16		29.800	44			42	32			36.5	33.5																	
17		29.900	45			40	32			40	39																	
18		29.834	47			46	37			44	43.5																	
19		29.950	48			40	37			40	37																	
20		29.132	46			43	35			39	37																	
21		29.230	41			40	26			36	35																	
22		29.540	41.5			40	30			35	33																	
23		28.748	41			39	31			36	33																	
24		29.170	43			40	31			38	36																	
25		29.680	42.5			39	32			45.5	45																	
26		29.800	41			38	27			30	29.5																	
27		29.886	44			33	27			31	30.5																	
28		29.850	39			35	24			29.5	29																	
29		29.936	39			32	22			26.5																		
30		29.400	39			32	21			31	30																	
31		29.400	42			36	27			32	31.5																	
Sums.		917.868	1309.5			1231	926			1141.5	988.5							17										
Means.		29.608	42.2			39.7	29.9			36.8	31.9																	
Index Errors.		*.018																										
Correc- tion for Diurnal Range.†																												
Corrected Means.		29.590	42.2			39.7	29.9			36.8	31.9																	
No. of Column.		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	

Barometer, mean corrected reading of Column No. 1 (A.M.),.....=.....
 Diameter of tube.....inch; correction for capillarity to be added,.....+.....
 Sum,.....*29.590
 Correction for Temperature from Column No. 2 to be deducted,.....=-.036
 Sum,.....29.554
 Correction for Height above Sea-level,.....feet, to add,.....=+.133
 Barometer corrected and reduced to 32° and Sea-level,.....=29.687

* corrected
 Barometer, Highest observed reading of Month,.....= 30.324 30.368 on 6
 Lowest do. do.,.....= 28.648 28.748 on 23d
 Difference, or Monthly Range,.....= 1.629

SUMMARY OF THE WINDS.										
Direction.	N	NE	E	SE	S	SW	W	NW	Calm or Variable.	Mean Force.
A.M.	3	3	1	2	1	8	4	6	3	2.20
P.M.										

Dry bulb Thermometer (mean of Cols. 9 and 10),.....36.8
 Wet bulb Thermometer (mean of Cols. 10 and 12),.....35.3
 † Dew-point Temperature,.....34.1
 † Elastic Force of Vapour,.....1.97 in.
 † Weight of Vapour in a Cubic Foot of Air,.....2.28
 † Additional Weight required to Saturate a Cubic Foot,.....0.32 lbs
 † Degree of Humidity (Saturation 100),.....93

Highest Reading Self-Registering Thermometer,.....30° on the 10th
 Lowest do. do.,.....21° on the 20th
 Difference, being Monthly Range,.....29°
 Mean of Self-Registering Thermometers,.....34.8°
 Mean Daily Range,.....9.8
 Greatest Daily Range,.....14

Rain 17 days

(Signed) Thomas David Gray
 (Designation) Student

* If the readings are taken at 9° and 3°, the 9° readings to be alone taken to account, as the correction for Diurnal Range in Scotland is unknown.
 † All these calculated from Glaisher's Hygrometric Tables, 1st Edition only.
 ‡ The Diurnal Range for Scotland is as yet unknown.

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

Index error and capillarity in one sum

2
Hinder

it may be more thoroughly wetted, use it will conduct the moisture more rapidly, 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 it Fleming's Rain Gauge² seem to possess several advantages over other forms, the Society gives the preference to them; but whenever form is employed, in order that all the stations may yield comparable results, it is recommended that the

stations are well comprehensible, it is recommended that the gauge be sunk in the ground, so that the top of the receiver is nearly on a level with the top blades of close-cut grass, in a place as distant as possible from trees, houses, high walls, and irregular or broken ground. When more than one rain gauge is kept, they ought to be placed near each other, but at different heights about the ground, and their indications noted in the *general remarks*, mentioning their height above ground—the register column in the Schedule being reserved for the ground rain gauge alone.

the *Stobbe*—being reserved for the ground Raan Gauge alone. *Stobbe*—Isolated wind-vanes or weather-cocks are apt to give false indications of the general direction of the wind, in consequence of the currents of air at the surface of the ground being so much influenced by the neighbourhood of hills, valleys, buildings, etc. Where low clouds are seen drifting along, their direction, in reference to known objects, or as noted by means of a mirror on which a compass may be laid, or by means of a circular mirror fixed over the centre of a pocket compass, will, in general, give the true direction of the current of air near the earth's surface. The motion of the higher strata of clouds gives no such indication. Fading the clouds, the general direction of the smoke in a chimney, or of a tall chimney, gives a better indication

of a hamlet, village, or of a tall chimney, gives a better indication of the general direction of the wind than any wind-rose. The observer should state whether the mass recorded is the direction by reflection or otherwise. It is generally agreed to reckon the force of the wind from 0 to 6; the latter being the severest hurricane in this island.

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

from about 0; a sky half covered with clouds is 5; and the whole visible sky covered with clouds is 10. Clouds often cover three-fourths or even more of the visible sky without obscuring the sunshine, so that the indications noted in the column for clouds would not necessarily express, or agree with, the column for sunshine. As the fill more *so long as it is above the horizon*, in thought for some eminent students to have a powerful effect in dispelling clouds, it would be well to note in the general observations any facts bearing on this point, for a few days (or nights, as the case may be) before and after every full moon; and the same observations ought to be made at the periods of new moon.

Sunshine.—The amount of sunshine may be represented by curves in the fractional form of sunrise and the *discontinuity* indicates

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

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

It is recommended to have Thermometers sunk 3 inches and 12 inches below the surface of the ground, to ascertain the temperature of what may be termed the agricultural soil.

Temperature of the Sea.—As the meteorology of the island is quite incomplete without a knowledge of the mean temperature of the ocean which surrounds it, the Society strongly recommends making the temperature of the sea at a depth of 6 feet or 1 fathom from the end of all piers or rocks round the coast, where free from the influence of river water, and as near as may be above the tides, to be taken at the same time of day, and with the same instrument, if possible, covered with a sloping lid, and with a weight attached, is sunk to the required depth, and in ten minutes drawn up and read. Convenient and cheap instruments are furnished by Messrs Adair and Son, and Mr Bryson, Edinburgh.

The temperature of springs or deep wells is recommended to

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

Mitons, Ayrton Bonelli's, Removable Depression or Elevation of, Resonance, Remarkable Pulse of Rain, Heat or Snow, Thunder and Lightning, etc., should be specially noticed, together with the exact time at which they were first seen, their continuance, and direction.

of each kind should therefore be chosen (if possible early kinds), and their indications should be alone noted—always the same from year to year being noted.

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

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

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 mesh; the evaporation from the ice going on as from the simply wetted bulb.

Klein Giv'e. As 'Planning's Rain Ganges' seem to possess several advantages over 'Planning's Rain Ganges' to them; but whatever form be employed, it is ordered that all the stations may yield comparable results, it is recommended that the Ganges 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 broken ground. When more than one Rain Gange is kept, they ought to be placed near each other, but at different heights about the ground, and their indications noted in the *general remarks*, mentioning their height above ground—the regular column in the Schedule being reserved for ground Rain Gange alone.

Ono 6 to 6; the latter being the severest hurricane in this island.

Clouds—the Society recommends observers to adopt the Howard nomenclature of clouds. The scale of cloud in the visible sky is 0; a sky half covered with cloud is 5; and three-quarters sky covered with cloud is 10. Clouds often cover three-visible or even more of the visible sky without obscuring the sunshade, so that the indications noted in the column for clouds would not necessarily express, or agree with, the column for sunshade. As the fill number, *so long as it is above the horizon*, is thought by some eminent observers to have a general bearing on all depending clouds, it would be well to note in the general observations any facts bearing on this point, for a few days (or nights), in the case they may be before and after every full moon; and the same observations ought to be made after the periods of new moon. — 1

Sunshine—The amount of sunshine may be represented by $\frac{1}{2}$. The fractional form, of which the *denominator* indicates the number of hours from sunrise to sunset, and the *numerator* the number of hours the sun shines. Thus, if the sun rose at 6, and set at 6, and during that period shone for 3 hours, it would be registered as $\frac{3}{12}$.

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

Temperature of the Sea.—As the meteorology of the island is so variable, and the water so shallow, it is not surprising that the water is quite incomplete without a knowledge of the mean temperature of this ocean which surrounds it. The Society strongly recommends that the temperature of the sea at a depth of 6 feet or 1 fathom from the surface of the water, and at a depth of 10 fathoms from the bottom, be taken at all places or rocks round the coast, where free from the influence of river waters, and as near as may be about the same time of day. A thermometer, which has been fixed in a small hole in the rock at the bottom of the water, and which is attached to a line, is sent to the required depth, and in ten minutes drawn up and read. Convenient and cheap instruments are furnished by Messrs Adams and Son, and also Mr Bryson, Edinburgh.

The temperature of springs and deep wells is recommended to be taken whenever practicable, mentioning whether spring or well, and its depth from the surface. *Alcornoque*, *Arum*, *Boragin*, *Ranunculus*, *Veronica*, *Geranium*, *Fuchsia*, *Primula*, *Viola*, and *Hyacinth*, etc., should be specially noticed, together with the exact time of day, the season, and the place, and the soil in 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. *Indicating* trees or shrubs of each kind should therefore be chosen (if possible early kinds), and their indications should be chosen (if possible early kinds), and from year to year being noticed.

Onion—mention whether Schottens's or Moffat's scale and papers are used. *Flory* may be had at Messrs Ait and Son's, 50, Princes Street, and at Mr Bryson's, 60, Princes Street, Edinburgh. *Electricity*—Pith balls suspended by a silk thread, in connection with a metallic conductor, and under cover, and the degrees of a circle being used to express the degree of repulsion, form a cheap and convenient electrometer. Excised guss or sealing-acetum ascertainment the nature of the electricity.

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

Have the goodness also to state any information you may be able to collect relative to the Croys 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
W 15 M
1857

DR STARK,

Sec., Meteorological Society,

21, Rutland Street,

EDINBURGH

METEOROLOGICAL RETURNS.

APR 14 1857

3

Distance from Sea 2 miles.

During the MONTH of January 1857

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,

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,

Height, = +

At 32° and Sea-level, =

Barometer, Highest observed reading of Month, =

Lowest do. do., =

Difference, or Monthly Range, =

SUMMARY OF THE WINDS.

Direction.	N	NE	E	SE	S	SW	W	NW	Calm or Variable.	Mean Force.
A.M.	1	3	1	1	1	9	4	7	4	18
P.M.	2	3	1	5	2	2	1	3	2	26

Highest Reading Self-Registering Thermometer,.....	_____	on the _____	$\begin{array}{r} 24.4 \\ 2.26 \end{array}$
Lowest do. do,.....	_____	on the _____	
Difference, being Monthly Range,.....	_____		
Mean of Self-Registering Thermometers,.....	_____		
Mean Daily Range,.....	_____		
Greatest Daily Range,.....	_____		

(Signed) Alexander Bruchshank
(Designation) 12 Rose Street Aberdeen

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

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

Shubert

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 parts 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:

Mode 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 admissible 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 and 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, p. 13. The barometric readings of the Barometer ought to be entered on the schedule as read off, and the corrections only applied to the mean for the month.

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

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

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

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

Hygrometer.—The wet bulb requires the muslin covering it to be often changed. In towns once a month, or often, 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 stretch, before being used; and the cotton wick which conducts moisture to it should be previously soaked in a solution of washing soda, and then in pure water, before being attached, in order that

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

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

Winds.—Isolated wind-vanes or weather-cocks are apt to give false indications of the general direction of the wind, in consequence of the currents of air at the surface of the ground being so much influenced by the neighbourhood of hills, valleys, buildings, etc. Where low clouds are seen drifting along, their direction in reference to known objects, or as noted by means of a mirror fixed over the centre of a pocket compass, will, in general, give the true direction of the current of air near the earth's surface. The motion of the higher strata of clouds gives no such indication. Failing the clouds, the general direction of the smoke of a hamlet or village, or of a tall chimney, gives a better indication of the general direction of the wind than the wind-vane. The observer should state whether he has ascertained the direction by reflection or otherwise. It is generally agreed to reckon the force of the wind from 0 to 5; the latter being the average maximum of this island.

Clouds.—The Society recommends observers to adopt the Howard nomenclature of clouds. The scale of cloud in the visible sky is reckoned from 0 to 10. Thus, a sky quite free from cloud is 0; a sky half covered with clouds is 5; and the whole visible sky covered with clouds is 10. Clouds often appear in lines, from this 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 dispersing clouds, it would be well to note in the general observations any facts bearing on this point, for a few days; for nights, as the case may be) before and after every full moon; and the same observations ought to be made at the periods of new moon.

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

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

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

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

Meteors, Aurora Borealis, Remarkable Depression or Elevation of Barometer, Remarkable Falls of Rain, Hail or Snow, Thunder and Lightning, etc. should be specially noticed, together with the exact hour at which they were first seen, their continuance and direction. *Budling, 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.

Gazette.—Mean in whicher, Schombert's or Meiff's scale and papers are used. They may be had at Messrs. Adie and Son's, 30, Rines Street, and at Mr. Bryson's, 60, Rines Street, Edinburgh. *Electricity.*—Thin balls suspended by a silk thread, in connection with a metallic conductor, and under cover, and the degrees of a circle being used to express the degree of repulsion, form a cheap and convenient electrometer. Excited glass or sealing-wax ascertains the nature of the electricity.

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 planted, or in perfection; whether any have suffered from blight, disease, etc. Whether Epizootic disease prevails among Cattle; and the agricultural condition of the district generally.

OBSERVATIONS IN CONNECTION WITH THE PERIODICAL RETURN OF THE SEASONS.

FOREST TREES.	Flower.	Leaf buds first appear.	In Leaf.	Divested of Leaves.	CROPS, mentioning variety.	First in Blossom.	Fruit ripe generally.	MIGRATORY BIRDS.	First Arrival.	Departure.
Barberry,			Apple,		Barley,			Cuckoo,		
Boutree or Elder,			Black Currant,		Beer or Big,			Curlew,		
Broom,			Cherry,		Peas,			House-Swallow,		
Hazel,			Gooseberry,		Oats,			Lapwing,		
Hawthorn,			Plum,		Turnips,			Plover,		
Holly,			Pear,		Beans,			Sand Martin,		
Laburnum,			Strawberry,		Wheat,			Starling,		
Lilac,					Peas,			Swan,		
Mountain Ash or Rowan,					Barley,			Rail,		
Red Flowering Currant,					Beer or Big,			Other Birds, naming them—		
Rhododendron Ponticum,										
Whin,										

FEB 4 1857

DR STARK,

Sec., Meteorological Society,

21, Rutland Street,

EDINBURGH.

SCOTTISH METEOROLOGICAL SOCIETY.

Observations taken at Aberdeen, County of Aberdeen, in Lat. 57° 9' N, Long. 2° 6' W, Height above mean level Sea 115 feet.
Distance from Sea 1/2 miles. During the MONTH of February 1857.

Days of Week.	Days of Month.	BAROMETER.		SELF-REGISTERING THERMOMETERS.				HYGROMETER.				WIND.				RAIN.		CLOUD.	SUNSHINE.	THERMOMETERS under Ground.		TEMPERATURE OF SPRING or WELL.	TEMPERATURE of SEA.	OZONE.	ELECTRICITY.	GENERAL REMARKS. As to occurrence of Thunder, Lightning, Storms, Hail, Meteors, Remarkable Depression or Elevation of Barometer, etc. Mention the hour at which these began and ended.		
		h. A.M.		h. P.M.		Max. in Air.	Min. in Air.	Max. Black bulb in Sun.	Min. Black bulb over Grass.	h. A.M.		h. P.M.		Direction.	Mean Force 1-6.	Direction.	Mean Force 1-6.			Days on which it fell.	Amount.						h. A.M.	
		Barometer.	Attached Thermometer.	Barometer.	Attached Thermometer.					Dry bulb.	Wet bulb.	Dry bulb.	Wet bulb.														3 inches.	12 inches.
1		29.792	43			34	21			27	26.5																	
2		29.450	41			37	26			37	35																	
3		29.800	41			38	31			35	32																	
4		30.000	38			37	25			28	27.5																	
5		29.538	40			37	25			37	36																	
6		29.490	43			45	32			37.5	35																	
7		29.180	45			43	34			42.5	41.5																	
8		29.384	42			45	30			35	33																	
9		29.414	40			40	32			37	36																	
10						42	34			39	38																	
11		29.362	41			43	31			38	36																	
12		29.882	43			44	31			39	35																	
13		29.930	47			46	35			43	41																	
14		29.936	49			50	38			43.5	43																	
15		30.232	48			49	37			42	40																	
16		29.992	46			43	35			40	38																	
17		29.812	40			41	35			38	37.5																	
18		29.986	45			46	34			39.5	39																	
19		30.074	46			48	31			36	34.5																	
20		30.116	46			44	31			39	38.5																	
21		29.850	42			42	32			40	39.5																	
22		29.750	48			48.5	38			47	44																	
23		30.058	48			49	33			38	35																	
24		30.026	46			45	34			42	40.5																	
25		29.950	43			45	33			41.5	40																	
26		30.200	40			41	27			36	33.5																	
27		30.540	49			45.5	32			45.5	44																	
28		30.220	52			55	42			50	47																	
29																												
30																												
31																												
	Sums.	834.826	1233			1223	899			1093	1046.5																	
	Means.	29.815	44.63			43.6	29.9			39.6	37.3																	
	Index Errors.	* -0.018																										
	Correction for Diurnal Range.†																											
	Corrected Means.	29.876	44.63			43.6	29.9			39	37.3																	
	No. of Column.	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	

Barometer, mean corrected reading of Column No. 1 (A.M.),.....= 29.876
Diameter of tube.....inch; correction for capillarity to be added,.....+ 0.018
Sum,.....29.815
Correction for Temperature from Column No. 2 to be deducted,.....= 0.043
Sum,.....29.772
Correction for Height above Sea-level,.....feet, to add,.....= 1.15
Barometer corrected and reduced to 32° and Sea-level,.....= 29.907
Column No. 3 (P.M.),.....= 30.162
Capillarity,.....= 0.018
Sum,.....30.174
Temp. from Col. 4,.....= 0.043
Sum,.....30.131
Height,.....= 1.15
At 32° and Sea-level,.....= 29.907
Barometer, Highest observed reading of Month,.....= 30.162
Lowest do. do.,.....= 29.119
Difference, or Monthly Range,.....= 1.043

SUMMARY OF THE WINDS.											
Direction.	N	NE	E	SE	S	SW	W	NW	Calm or Variable.	Mean Force.	
A.M.											
P.M.	0	1/2	0	1/2	4	17 1/2	2 1/2	2	1	2.40	

Dry bulb Thermometer (mean of Cols. 9 and 11),.....39.0
Wet bulb Thermometer (mean of Cols. 10 and 12),.....37.3
† Dew-point Temperature,.....35.0
† Elastic Force of Vapour,.....0.24 in.
† Weight of Vapour in a Cubic Foot of Air,.....2.56 grs.
† Additional Weight required to Saturate a Cubic Foot,.....0.48 grs.
† Degree of Humidity (Saturation 100),.....86
Highest Reading Self-Registering Thermometer,.....55° on the 29th
Lowest do. do.,.....21° on the 1st
Difference, being Monthly Range,.....34°
Mean of Self-Registering Thermometers,.....37.8
Mean Daily Range,.....11.5
Greatest Daily Range,.....17

(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 deducted. 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

Shudlen

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

In the conditions necessary to be applied to the Bacterometer readings depend on the form of the instrument. The mode of making these corrections, and the tables compiled for the purpose, will be found in the 4th Report of the Committee of the Royal Society on Physics and Meteorology, 17840, p. 15. The daily readings of the Bacterometer ought to be entered on the Schedule as read *up*, and the corrections only applied to the mean for the month. *Self-Regulating Thermometers and Hygrometers*.—These should be placed alongside of each other in a place freely exposed to the air, but protected from sunshine, and from reflected heat, as well as from radiation and from rain, and its near as may be *four feet* from the general surface of the ground. Different contrivances are used for this purpose, either a double vented box with louver-banded sides, fixed at a north window, and projecting 12 inches from the wall, so as to allow a free current of air to pass between the box and the wall, or in a double meat-stall vented box with louver-banded sides, fixed in an exposed place, and if possible over grass. Whatever means are finally adopted 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 maximum Registering Thermometry, 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* Reckoning Thermometer, for ascertaining the lowest temperature during the night from radiation, should have its bulb similarly blackened and rounded dial, 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.

Hypocaust.—The wet bulb requires the masha covering it to be often changed. In towns once a month, or often; if the weather is drier, and the masha gets foul; in the country whenever the masha seems to be foul. The bulb should be covered with thin tissue or blotting paper below the masha, and the masha 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.

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

Winds.—Isolated wind-vents 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 interfered by the neighbourhood of hills, valleys, buildings, &c. Where the winds are seen drifting along their three principal directions, the objects, as marked by means of a line, in reference to which the wind-vent is placed, will in minor or less fixed direction, give the true direction of the wind, to which a compass needle will conform. The fixed direction of the current of air near the earth's surface, the direction of the higher strata of clouds, or the smoke indication. Failing the clouds, the general direction of the smoke

of a hammer, or of a tail chimney, gives a better indication of the general direction of the wind than any wind-vane. The observer should state whether he has ascertained the direction by reflection or otherwise. It is generally agreed to reckon the force of the wind from 0 to 6; the latter being the severest hurricanes in this island.

Clouds.—The Society recommends observers to adopt the Howard nomenclature of clouds. The scale of cloud in the visible sky is reckoned from 0 to 10. Thus, a sky quite free

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

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

Thermometers' scales. *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 convenient temperature. To collect facts which may illustrate this it is recommended to have Thermometers sunk 3 inches and 12 inches below the surface of the ground, to ascertain the temperature of what may be termed the agricultural soil.

Temperature of the Sea.—As the meteorology of the island is so variable, and the water so shallow, the temperature of the surface of the ocean which surrounds it, the Society strongly recommends that the temperature of the sea at a depth of 6 fathoms, and on the east of all piers or rocks near the coast, where there is a strong current, be ascertained at least once a month, at the time of high water. This may be done by means of a small tin pichet, covered with a sloping lid, and with a weight attached, is sunk to the required depth, and in ten minutes drawn up and read. Convenient and cheap instruments are furnished by Messrs Aird and Son, and Mr Bryson, Edinburgh.

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

Meteors.—*Aurora Borealis.*—*Remarkable Depression or Erection of Mountains.*—*Uncommon Fills of Rivers.*—*Hail on Snow.*—*Thunder and Lightning* etc., should be specially noticed, keeping with the exact date at which they were first seen, their continuance, and direction.

Budding, Leaf-fall, and *Flooding of Trees*.—It is necessary to bear in mind that varieties of the same species of trees differ widely in their times of budding and flowering. *Judicial* trees or shrubs of each kind should therefore be chosen (if possible early kinds), and their indications should be alone noted—always the same—from year to year being noticed.

Zeus—Mon, whether Schottberg's or Moritz's scale and cups are used. They may be had at Messrs Adie and Son's, 50, Princes Street, and at Mr Bryson's, 60, Princes Street, Edinburgh.

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

FOREST TREES.	Flower.	Leaf buds first appear.	In Leaf.	Disappearance of Leaves.	CROPS mentioning variety.	Sowing or Planting.	Appropriation above Ground.	In Ear or Flower.	First Cut or Raisin.
Alder.....					Barley.....				
Ash.....					Beet or Big.....				
Beech.....					Oats.....				
Birch.....					Wheat.....				
Elm.....					Beans.....				
Larch.....					Pease.....				
Lime.....					Potatoes.....				
Oak.....					Turnips.....				
Sycamore or Plane.....					Rye Grass.....				

SHRUBS, ETC.	First in Blossom.	FRUITS.	First in Blossom.	Fruit Ripe generally.	MIGRATORY BIRDS.	First Arrival.	Departure.
Berry.....					Chickadee.....		
Bonny or Elder.....		Berry.....			Cuckoo.....		
Broom.....		Cherry.....			Curlew.....		
Bush.....		Gentian.....			House-Swallow.....		
Blackberry.....		Gentian.....			Lapwing.....		
Hawthorn.....		Gooseberry.....			Plover.....		
Holly.....		Peach.....			Sund-Martin.....		
Juniper.....		Pear.....			Starling.....		
.....		Plum.....			Swan.....		
.....		Strawberry.....			Rail.....		
.....					Other Birds, naming them.....		
Rhododendron Ponticum.....							
Whin.....							

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

21, Rutland Street,


Sec., Meteorological Society,

DR STARK,

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Feb

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SCOTTISH METEOROLOGICAL SOCIETY.

Observations taken at Aberdeen, County of Aberdeen, in Lat. 57° 9' N, Long. 2° 57' W, Height above Sea 90 feet.

Distance from Sea 2 miles.

During the MONTH of February 1857.

Days of Week.	Days of Month.	BAROMETER.				SELF-REGISTERING THERMOMETERS.				HYGROMETER.				WIND.				RAIN.		CLOUD.	SUNSHINE.	THERMOMETERS under Ground.		TEMPERATURE of SPRING or WELL.	TEMPERATURE of SEA.	OZONE.	ELECTRICITY.	GENERAL REMARKS. As to occurrence of Thunder, Lightning, Storms, Hail, Meteors, Remarkable Depression or Elevation of Barometer, etc. Mention the hour at which these began and ended.
		h. A.M.		h. P.M.		Max. in Air.	Min. in Air.	Max. Black bulb in Sun.	Min. Black bulb over Grass.	h. A.M.		h. P.M.		Direction.	Mean Force 1-6.	Direction.	Mean Force 1-6.	Days on which it fell.	Amount.			h. A.M.						
		Barometer.	Attach- ed Ther- mometer.	Barometer.	Attach- ed Ther- mometer.					Dry bulb.	Wet bulb.	Dry bulb.	Wet bulb.									3 inches.	12 inches.					
		Barometer.	Attach- ed Ther- mometer.	Barometer.	Attach- ed Ther- mometer.																							
		Barometer.	Attach- ed Ther- mometer.	Barometer.	Attach- ed Ther- mometer.																							
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		Barometer.	Attach- ed Ther- mometer.	Barometer.	Attach- ed Ther- mometer.																							
		Barometer.	Attach- ed Ther- mometer.	Barometer.	Attach- ed Ther- mometer.																							

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,.....
 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,.....
 Height,.....=.....+.....
 At 32° and Sea-level,.....=.....

Barometer, Highest observed reading of Month,.....=.....
 Lowest do. do.,.....=.....
 Difference, or Monthly Range,.....=.....

SUMMARY OF THE WINDS.										
Direction.	N	NE	E	SE	S	SW	W	NW	Calm or Variable.	Mean Force.
A.M.	0	1	0	0	3	2	1	1	1	2.5
P.M.	0	0	0	1	5	14	4	3	1	2.3

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,.....on the.....
 Lowest do. do.,.....on the.....
 Difference, being Monthly Range,.....
 Mean of Self-Registering Thermometers,.....
 Mean Daily Range,.....
 Greatest Daily Range,.....

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

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

(Signed) Alex Cruchshank
 (Designation) 12 Rose St Aberdeen

Sheldon

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 stamp up. The mercury should then be completely fill the tube. If any air has got admittance, it should be driven into the cistern by reversing the instrument, and tapping it gently with the hand. If it cannot be thus expelled, the instrument is useless till repaired.

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

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

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

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

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

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

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

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

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

Winds.—Isolated wind-vanes or weather-cocks are apt to give false indications of the general direction of the wind in consequence of the currents of air at the surface of the ground being so much influenced by the neighbourhood of hills, valleys, buildings, etc. Where low clouds are seen drifting along their direction in reference to known objects, or as noted by means of a mirror on which a compass may be laid, or by means of a circular mirror fixed over the centre of a pocket compass, will, in general, give the true direction of the current of air near the earth's surface. The motion of the 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 observations should be taken at the direction by reflection or otherwise. It is generally agreed to reckon the force of the wind from 0 to 6; the latter being the severest hurricane in this island.

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

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

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

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

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

Meteors, Aurora Borealis, Remarkable Depression or Elevation of Barometer, Unusual Falls of Rain, Hail or Snow, Thunder and Lightning, etc. should be specially noticed, together with the exact hour at which they were first seen, their continuance, and direction. **Building, Leaping, 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.

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

OBSERVATIONS IN CONNECTION WITH THE PERIODICAL RETURN OF THE SEASONS.

FOREST TREES.	Flower.	Leaf buds first appear.	In Leaf.	Directed of Leaves.	Crops mentioning variety.	Sowing or Pruning.	MIGRATORY BIRDS.	First Arrival.	Departure.
Barberry,	Cuckoo, .....	.....	.....
Bartree or Elder,	Curlew, .....	.....	.....
Broom,	Hedge-Swallow, .....	.....	.....
Burnum,	Lapwing, .....	.....	.....
Cherry,	Plover, .....	.....	.....
Gooseberry,	Sand-Martin, .....	.....	.....
Holly,	Starling, .....	.....	.....
Lilac,	Swan, .....	.....	.....
Mezerion,	Other Birds, naming them- selves, .....	.....	.....
Mountain Ash or Rowan,	Rail, .....	.....	.....
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, etc., and any other Agricultural condition of the district generally.

METEOROLOGICAL RETURNS.

EDINBURGH.

Sec., Meteorological Society,

DR STARK,



SCOTTISH METEOROLOGICAL SOCIETY.

Observations taken at Aberdeen, County of Aberdeen, in Lat. _____, Long. _____, Height above Sea mean level of 115 feet.
Distance from Sea 1 1/2 miles. During the MONTH of March 1857.

Days of Week.	Days of Month.	BAROMETER.		SELF-REGISTERING THERMOMETERS.				HYGROMETER.				WIND.				RAIN.		CLOUD.	SUNSHINE.	THERMOMETERS under Ground.		Temperature of SPRING or WELL.	Temperature of SEA.	OZONE.	ELECTRICITY.	GENERAL REMARKS. As to occurrence of Thunder, Lightning, Storms, Hail, Meteors, Remarkable Depression or Elevation of Barometer, etc. Mention the hour at which these began and ended.		
		8-42 ^h . A.M.		h. P.M.		Max. in Air.	Min. in Air.	Max. Black bulb in Sun.	Min. Black bulb over Grass.	8-42 ^h . A.M.		h. P.M.		h. A.M.		Days on which it fell.	Amount.			h. A.M.								
		Barometer.	Attach- ed Ther- mometer	Barometer.	Attach- ed Ther- mometer					Dry bulb.	Wet bulb.	Dry bulb.	Wet bulb.	Direction.	Mean Force 1-6.					Direction.	Mean Force 1-6.						3 inches.	12 inches.
1		30.580	54			58.5	40			46.5	44																	
2		30.426	55			55	36			42	40																	
3		30.274	49			50	35			39	38																	
4		29.774	49			51.5	36			44	39																	
5		29.950	44			45	29			35.5	32																	
6		29.676	52			48	33			43	38																	
7		29.600	56							41	36																	
8		29.300	48			45	26			34	31.5																	
9		30.062	48				31			34	33																	
10		30.050	45			40	23			31	29																	
11		29.732	43			39	27			36	32																	
12		29.862	47			41	25			33	29.5																	
13		29.482	42			41				40.5	39.5																	
14		28.680	41			42	33			40	36.5																	
15		28.650	48			44	32			40.5	35.5																	
16		29.580	48			43	32			40.5	36																	
17		29.682	48			47	37			43	41																	
18		29.700	45			47	38			46.5	43.5																	
19		29.900	45			46	33			36.5	36																	
20		30.060	45			43	32			43	42.5																	
21		30.464	42			43	35			40.5	36																	
22		30.318	45			40	33			40	35																	
23		29.928	43			42	31			36	35																	
24		29.726	42			42	32			37	36																	
25		29.744	44			41	35			40.5	39.5																	
26		29.842	45			42	35			40.5	40																	
27		30.050	46			43	35			40.5	39																	
28		30.076	49			45	36			41	39																	
29		29.962	46			44	35			41	39																	
30		29.328	45							41.5	41																	
31		29.236	46			42.5	37			42.5	41.5																	
Sums.		929.644	144			1294.5	938			1234.5	1133.5																	
Means.		29.794	46.6			44.6	32.3			39.8	36.6																	
Index Errors.		-.018																										
Correc- tion for Diurnal Range.†																												
Corrected Means.		29.777	46.6			44.6	32.3			39.8	36.6																	
No. of Column.		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	

Barometer, mean corrected reading of Column No. 1 (A.M.),.....= _____ Column No. 3 (P.M.),.....= _____
Diameter of tube _____ inch; correction for capillarity to be added,.....+ _____
Sum,.....= 29.777
Correction for Temperature from Column No. 2 to be deducted,.....= -.047
Sum,.....= 29.730
Correction for Height above Sea-level, _____ feet, to add,.....= 1.33
Barometer corrected and reduced to 32° and Sea-level,.....= 29.863

Barometer, Highest, observed reading of Month,.....= 30.510 30.550 - on 1st
Lowest do. do.,.....= 28.600 28.650 - on 15th
Difference, or Monthly Range,.....= 1.910

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),.....= 39.8
Wet bulb Thermometer (mean of Cols. 10 and 12),.....= 36.6
† Dew-point Temperature,.....= 32.5
† Elastic Force of Vapour,.....= 18.4 in.
† Weight of Vapour in a Cubic Foot of Air,.....= 2.14 grs.
† Additional Weight required to Saturate a Cubic Foot,.....= 1.56 grs.
† Degree of Humidity (Saturation 100),.....= 75

Highest Reading Self-Registering Thermometer,.....= 58.5 on the 1st
Lowest do. do.,.....= 25 on the 11th
Difference, being Monthly Range,.....= 33.5
Mean of Self-Registering Thermometers,.....= 28.45
Mean Daily Range,.....= 12.3
Greatest Daily Range,.....= 19

(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 deducted. No Wax or Wafers ever to be employed in closing the Schedule—the Gummed Corner to be alone used.

The correction for capillarity and Index error in one sum

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.

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

Gaucho be sank 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 ways, and irregular or broken ground. When more than one Gaucho is kept, they are ought to be placed near each other, but at different heights about the ground, and their indications noted in the *general remarks*, mentioning their height above ground—the regular column in

Winda—Isolated whirl-waves or weather-circles are apt to give false indications of the general direction of the wind, in consequence of the currents of air at the surface of the ground being so much influenced by the neighbourhood of hills, valleys, buildings, &c. Where low clouds are seen drifting slowly, 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 creature firmly fixed over the centre of a pocket compass, will, in general, give the true direction of the currents of air near the earth's surface. The motion of the higher strata of clouds gives no such indication. Failing the clouds, the general direction of the smoke

of a hamlet or village, or of a tall chimney, gives a better indication of the general direction of the wind than any wind-vane. The usual state which has been ascertained the direction by revelation or otherwise. It is generally agreed to reckon the force of the wind from 0 to 5; the latter being the severest hurricane in this island.

Clouds.—The Society recomends 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 clouds is 5; and the whole visible sky covered with cloud is 10.

three-fourths or even more of the visible sky without obstructing the sunning, so that the indications noted in the column for clouds would not necessarily express, or agree with, the column for 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

disappointing, it would be well to note in the general observations on this subject, that the sun is not always shining, and that, as the sun may be behind a cloud, or the sun may be obscured by any facts bearing on this point, for a few days (or months), as the case may be, before and after every full moon; and the same observations ought to be made at the periods of new moon.

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

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

It is recommended to have Thermometers at 3 inches and 12 inches below the surface of the ground, to ascertain the temperature of what may be termed the agricultural soil.

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

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Meleors, A word Borealis, Remarkable Depression or Elevation of Barometre, Remarkable Spills of Rain, Hail or Snow, Thunder, Lightning, etc., should be especially noticed, together with the exact

about as which they were first seen, their combination, 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

[illegible]

FOREST TREES.	Flower.	Leaf buds first appear.	In Leaf.	Directed of Leaves.	CHOPS mentioning variety.	Sowing or Planting.	Apparent above Ground.	In Ear or Flower.	First Cut or Raised.
Alder.....					Barley.....				
Ash.....					Bear or Big.....				
Beech.....					Oak.....				
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.....			Curdew.....		
Broom.....		Cherry.....			House-Swallow.....		
Hazel.....		Gean.....			Lapwing.....		
Hawthorn.....		Gooseberry.....			Plover.....		
Holly.....		Peach.....			Sand-Martin.....		
Laburnum.....		Pear.....			Starling.....		
Lilac.....		Plum.....			Swan.....		
Mezereum.....		Strawberry.....			Rail.....		
Mountain Ash or Rowan.....					Other Birds, naming them.....		
Red Flowering Currant.....							
Rhododendron Ponticum.....							
Whin.....							

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METEOROLOGICAL RETURNS.

MARCH

Sec., Meteorological Society,

21, Rutland Street,

EDINBURGH.

ABE RDEA
AP 15
1857

INSTRUCTIONS FOR MAKING METEOROLOGICAL OBSERVATIONS.

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

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

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

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

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

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

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

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

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

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

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

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

Winds.—Isolated wind-vanes or weather-cocks are apt to give false indications of the general direction of the wind, in consequence of the currents of air at the surface of the ground being so much influenced by the neighbourhood of hills, valleys, buildings, etc. Where low clouds are seen drifting along, their direction in reference to known objects, or as noted by means of a mirror fixed over the centre of a pocket compass with, in general, give the true direction of the current of air near the earth's surface. The motion of the higher strata of clouds gives no such indication. Failing the clouds, the general direction of the stroke of a hand or village, or of a tall chimney, gives a better indication of the general direction of the wind than any wind-vane. The observations should be taken at the same time, and the direction of the wind should be noted as to whether it has shifted the direction by reflection or otherwise. It is generally agreed, however, that the force of the wind from 0 to 6; the latter being the severest hurricane on this island.

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

Sunshine.—The amount of sunshine may be represented by figures in the fractional form, of which the denominator indicates the number of hours from sunrise to sunset, and the numerator and set at 6, and during that period none for 3 hours, it would be expressed as $\frac{3}{6}$.

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

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

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

Meteors, Aurora Borealis, Remarkable Depression or Elevation of Barometer, Remarkable Fells 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. **Budling, 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 done noted—always the same plant from year to year being noticed.

Ozone.—Mention whether Schönbein's or Mofat's scale and papers are used. They may be had at Messrs. A. D. and Son's, 30, Princes Street, and at Mr. Bryson's, 60, Princes Street, Edinburgh. **Electricity.**—Thin balls suspended by a silk thread, in connection with a metallic conductor, and under cover, and the degrees of a circle being used to express the degree of repulsion, form a cheap and convenient electrometer. Escalated glass or sealing-wax ascertains the nature of the electricity.

OBSERVATIONS IN CONNECTION WITH THE PERIODICAL RETURN OF THE SEASONS.

SHRUBS, ETC.	First in Blossom.	FRUITS.	First in Blossom.	CROPS, mentioning variety.	Sowing or Planting.	Appling above ground.	In Bar or Flower.	First Cut or Raised.
Barberry,		Apple,						
Bourtree or Elder,		Black Currant,						
Broom,		Cherry,						
Hazel,		Gean,						
Hawthorn,		Gooseberry,						
Laburnum,		Pear,						
Lilac,		Plum,						
Mazoeon,		Strawberry,						
Mountain Ash or Rowan,								
Red Flowering Currant,								
Rhododendron Ponticum,								
Willow,								

Have the goodness also to enter 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 drought, insects, etc. Whether Epizootic disease prevails among Cattle; and the Agricultural condition of the district generally.

METEOROLOGICAL RETURNS.

EDINBURGH.

21, Rutland Street,

Sec., Meteorological Society,

DR STARK,

To

APR 6 1857

ABERDEEN 1857

SCOTTISH METEOROLOGICAL SOCIETY.

Observations taken at Aberdeen, County of Aberdeen, in Lat. 57° 9' N. Long. 2° 6' W. mean level of
Distance from Sea 1/2 miles. During the MONTH of April 1857. Height above Sea 115 feet.

Days of Week.	Days of Month.	BAROMETER.				SELF-REGISTERING THERMOMETERS.				HYGROMETER.				WIND.				RAIN.		CLOUD.	SUNSHINE.	THERMOMETERS under Ground.		Temperature of SPRING or WELL.	Temperature of SEA.	OZONE.	ELECTRICITY.	GENERAL REMARKS. As to occurrences of Thunder, Lightning, Storms, Hail, Meteors, Remarkable Depression or Elevation of Barometer, etc. Mention the hour at which these began and ended.
		h. A.M.		h. P.M.		Max. in Air.	Min. in Air.	Max. Black bulb in Sun.	Min. Black bulb over Grass.	h. A.M.		h. P.M.		Direction.	Mean Force 1-6.	Direction.	Mean Force 1-6.	Days on which it fell.	Amount.			h. A.M.						
		Barometer.	Attached Thermometer.	Barometer.	Attached Thermometer.					Dry bulb.	Wet bulb.	Dry bulb.	Wet bulb.									3 inches.	12 inches.					
1	29.392	45			43.5	37			41.5	41																		
2	460	47			45	38			43	42																		
3	600	47			44	36			42	40																		
4	850	47			44	38			43.5	42																		
5	900	46			45	37			41	40																		
6	812	45			41.5	36			41.5	41																		
7	814	45			43	38			41.5	42																		
8	688	54			47	37			47	44.5																		
9	564	53			52	39			48.5	46.5																		
10	400	46			50	39			45	42.5																		
11	366	44			49	36			42.5	39.5																		
12	240	50			46	30			39.5	34.5																		
13	116	50			44	31			41	38																		
14	244	48			45	32			41	39																		
15	342	48			46	36			42	40.5																		
16	840	46			44	30			42.5	41																		
17	840	53			49	31			45	42.5																		
18	774	53			50	40			50	48																		
19	730	57			52	40			47.5	46																		
20	30.834	58			58	40			51.5	47.5																		
21	140	57			59	39			51	46																		
22	050	55			55	39			45	42.5																		
23	094	53			47	38			43	38																		
24	050	47			45	33			42	37																		
25	29.822	44			46				42	37.5																		
26	30.112	50			44	31			41	37																		
27	192	47			44	25			42.5	38																		
28	030	45			49	34			42.5	39.5																		
29	150	50			49	30			42	38																		
30	124	52			50	28			44	44																		
31																												
Sums.	302.576	1476			1426	1050			1312	1215.5																		
Means.	29.752	47.6			45.7	35.7			42.3	39.5																		
Index Errors.	* -0.018																											
Correction for Diurnal Range.																												
Corrected Means.	29.734				45.5	35.1			42.3	38.5																		
No. of Column.	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26		

Barometer, mean corrected reading of Column No. 1 (A.M.),.....=29.734 Column No. 3 (P.M.),.....=29.812
Diameter of tube.....inch; correction for capillarity to be added,.....+.....
Sum,.....29.734 Sum,.....29.812
Correction for Temperature from Column No. 2 to be deducted,.....=0.055 Temp. from Col. 4,.....=59
Sum,.....29.679 Sum,.....29.757
Correction for Height above Sea-level,.....feet, to add,.....+.....133 Height,.....=72.3
Barometer corrected and reduced to 32° and Sea-level,.....=29.812 At 32° and Sea-level,.....=29.812

SUMMARY OF THE WINDS.										
Direction.	N.	NE	E	SE	S	SW	W	NW	Calm or Variable.	Mean Force.
A.M.	2	2	2	9	2	8	2	3	0	
P.M.										

Dry bulb Thermometer (mean of Cols. 9 and 11),.....43.7
Wet bulb Thermometer (mean of Cols. 10 and 12),.....41.1
† Dew-point Temperature,.....38.0
† Elastic Force of Vapour,.....0.229 inches
† Weight of Vapour in a Cubic Foot of Air,.....2.65 grs.
† Additional Weight required to Saturate a Cubic Foot,.....0.92 grs.
† Degree of Humidity (Saturation 100),.....80

Highest Reading Self-Registering Thermometer,.....59 on the 21st
Lowest do. do.,.....25 on the 27th
Difference, being Monthly Range,.....34
Mean of Self-Registering Thermometers,.....41.6
Mean Daily Range,.....12.4
Greatest Daily Range,.....22

(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 deducted. No Wax or Wafers ever to be employed in closing the Schedule—the Gummed Corner to be alone used.

Correction of for Index error, and Capillarity in one sum

$$\begin{array}{r} 1120 \\ 25 \overline{) 2500} \\ \underline{2500} \\ 0 \end{array}$$

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

the simply wetted bulb.

[illegible]

the Scheidele being reserved for the ground rain Gangs alone. *Winda's*—Isolated wind-vanes or weather-woods are said 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, trees, &c. Where low clouds are seen drifting along these directions, in reference to known objects, or as noted by means of a plummet on which a compass may be laid, or by means of a cotton plummet fixed over the centre of a compass mass, will, in general, give the true direction of the current of air; and, the earth's rotation, the motion of the higher strata of clouds, gives no such indication. Failing the clouds, the general direction of the wind is

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 assumed the direction by reflection from 0 to 6; the latter being the severest hurricane in this island.

Clouds.—The Society recommends observers to adopt the following nomenclature of clouds. The scale of cloud in the visible sky is reckoned from 0 to 10. Thus a sky with two

from cloud 0) a sky half covered with cloud is 5, and the whole visible sky without clouds is 10. Clouds often cover three-fourths or even more of the visible sky without obstructing the sunning so that the indications noted in the column for clouds would not necessarily express, or agree with, the column for sunning. As the full moon, so *long as it is above the horizon*, is brought by some common error to be so low a power effect in sunning, it would be well to note in the general observations any days bearing on this point, for a few days (ordinally, 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.

The figures in the original form may be represented by the number of points from 0 to 10, which the *kleptomator* indicates as the number of joints from sun shine to dusk, and the numerical value of joints the sun shines to dusk can rise at 6, and set at 6; and turning that period alone for 3 hours, it would registered as $\frac{8}{3}$.

Kleptomators under Ground.—Through the temperature and hygrometric conditions of the air are those which chiefly influence the growth of crops, it is important for the health of the crop, and the germination of the seed, that the soil itself should have a temperature.

To collect facts which may illustrate this,

is recommended to have a Thermometer sunk 5 inches and 12 inches below the surface of the ground, to ascertain the temperature of what may be termed the agricultural soil.

Temperature of the Sea.—As the meteorology of the island is so incompatible without a knowledge of the mean temperature of the ocean which surrounds it, the Society strongly recommends that the temperature of the sea at a depth of 6 fathoms, 1 fathom, and at 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 pitche, covered with a sloping lid, and with a weight attached, is sunk to the required depth, and in ten minutes drawn up and read. Convent and clock instruments are furnished to Messrs Adie and Son, and Mr. Bryson, Edinburgh.

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

Doctors, Annona Borealis, Remarkable Depression or Elevation of Temperature, Remarkable Falls of Rain, Earth or Snow, Thunder and Lightning, etc., should be specially noticed, together with the exact date.

at which they were first seen, their continuance, and direction. *Building, Laying, and Flowering of Trees.*—It is necessary to be in mind that varieties of the same species of tree often widely differ in their modes of leafing and flowering. *Arbutus* trees or shrubs of this kind should therefore be chosen (if possible early kinds), their indications should be alone noted—always the same at home year by year being noted.—Mention whether Stouven's or Meiffert's scale and *Arbutus* are used. They may be had at Messrs Adie and Son's, 50, Abchurch Lane, London; or at Mr Bryson's, 60, Princess Street, Edinburgh.—Pith balls suspended by a silk thread, in connection with a metallic conductor, and under cover, and the degrees of electric being used to express the degree of repulsion, form a simple and convenient electrometer. Etched glass or sealing-wax contains the figure of the electricity.

FOREST TREES.	Flower.	Leaf Buds first appear.	In Leaf.	Directed to Leaves.	CROPS, mentioning variety.	Spring or Planting.	Appearing above Ground.	In Ear or Flower.	First Cut or Harvest.
Alder,					Barley.....				
Ash,					Beer or Big,.....				
Beech,.....					Oats,.....				
Birch,.....					Wheat.....				
Elm,.....					Beans,.....				
Larch,.....					Pease,.....				
Line,.....					Potatoes,.....				
Oak,.....					Turnips,.....				
Sycamore or Plane,.....					Rye Grass,.....				

SHRUBS, ETC.	First in Blossom.	FRUITS.	First in Blossom.	Fruit Ripen generally.	MIGRATORY BIRDS.	First Arrival.	Departure.
Barberry,		Apple,			Cuckoo,		
Bourserie 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,		
Mezereum,		Strawberry,			Rail,		
Mountain Ash or Rowan,					Other Birds, naming them—		
Red Flowering Currant,							
Rhododendron Ponticum,							
Whin,							

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

21, Rutland Street,

Sec., Meteorological Society,

DR STARK,

 \mathcal{O}_L

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SCOTTISH METEOROLOGICAL SOCIETY.

Observations taken at Aberdeen, County of Aberdeen, in Lat. 57° 9', Long. 2° 7', Height above Sea 90 feet.Distance from Sea 2 miles.During the MONTH of April 1857.

Rain Snow Hail Sleet
 a few drops not day 1
 little snow 2
 snow 3
 rain and hail 4
 much heavy 5
 6

Days of Month.	BAROMETER.				SELF-REGISTERING THERMOMETERS.				HYGROMETER.				WIND.				RAIN.		THERMOMETERS under Ground.				TEMPERATURE OF SEA.	OZONE.	ELECTRICITY.	GENERAL REMARKS. As to occurrence of Thunder, Lightning, Storms, Hail, Meteors, Remarkable Depression or Elevation of Barometer, etc. Mention the hour at which these began and ended.
	h. A.M.		h. P.M.		Max. in Air.	Min. in Air.	Max. Black bulb in Sun.	Min. Black bulb over Grass.	h. A.M.		h. P.M.		h. A.M.		h. P.M.		Days on which it fell.	Amount.	h. A.M.		CLOUD.	SUNSHINE.				
	Barometer.	Attach- ed Ther- iometer	Barometer.	Attach- ed Ther- iometer					Direction.	Mean Force 1-6.	Direction.	Mean Force 1-6.	1-10	12 inches.	12 inches.											
																inches.			.	inches.						
1													SE	1	SE	0.25	1	9	0	41	40	43		2 rain, mist, Pelasius vulgaris first seen		
2													SE	2.25	SE	4	1	10	0	40	40	43		3 rain, mist		
3													SE	0.25	SE	1	1	10	0	41	41	43		4 rain mist		
4													SE	1	SE	1	1	10	0	41	40.5	43		3 rain mist		
5													SE	2.25	SE	4	1	10	0	40	41	42.5		4 rain		
6													SE	0.25	SE	2.25	1	10	0	40	40.5	42.5		4 rain		
7													SE	0.25	SE	0.25	1	10	0	41.5	41.5	43.		3 — mist		
8													SE	0.25	SE	0.25	1	10	0	41.5	41.5	43.		3 — lunar halo		
9													SE	0.25	SE	0.25	1	10	0	41.5	41.5	43.		2 —		
10													SE	0.25	SE	0.25	1	10	0	41.5	41.5	43.		3 — mist, Ramunculus lucaria first seen		
11													SE	0.25	SE	0.25	1	10	0	41.5	41.5	43.		3 — 1 sheet hail, lightning evening		
12													SE	0.25	SE	0.25	1	10	0	41.5	41.5	43.		3 hail		
13													SE	0.25	SE	0.25	1	10	0	41.5	41.5	43.		3 hail		
14													SE	0.25	SE	0.25	1	10	0	41.5	41.5	43.		3 hail		
15													SE	0.25	SE	0.25	1	10	0	41.5	41.5	43.		3 hail		
16													SE	0.25	SE	0.25	1	10	0	41.5	41.5	43.		3 hail		
17													SE	0.25	SE	0.25	1	10	0	41.5	41.5	43.		3 hail		
18													SE	0.25	SE	0.25	1	10	0	41.5	41.5	43.		3 hail		
19													SE	0.25	SE	0.25	1	10	0	41.5	41.5	43.		3 hail		
20													SE	0.25	SE	0.25	1	10	0	41.5	41.5	43.		3 hail		
21													SE	0.25	SE	0.25	1	10	0	41.5	41.5	43.		3 hail		
22													SE	0.25	SE	0.25	1	10	0	41.5	41.5	43.		3 hail		
23													SE	0.25	SE	0.25	1	10	0	41.5	41.5	43.		3 hail		
24													SE	0.25	SE	0.25	1	10	0	41.5	41.5	43.		3 hail		
25													SE	0.25	SE	0.25	1	10	0	41.5	41.5	43.		3 hail		
26													SE	0.25	SE	0.25	1	10	0	41.5	41.5	43.		3 hail		
27													SE	0.25	SE	0.25	1	10	0	41.5	41.5	43.		3 hail		
28													SE	0.25	SE	0.25	1	10	0	41.5	41.5	43.		3 hail		
29													SE	0.25	SE	0.25	1	10	0	41.5	41.5	43.		3 hail		
30													SE	0.25	SE	0.25	1	10	0	41.5	41.5	43.		3 hail		
31													SE	0.25	SE	0.25	1	10	0	41.5	41.5	43.		3 hail		
Sums.													33.00	67.45	3.10	260	161	1204.5	1254	1304				Bulls of grain crops were sown during 23 & 24 hrs of Apr, & most of the field potatoes planted during the same.		
Means.													1.10	1.58		7	5	10.15	41.80	43.44				Pashur backward & injured by frost		
Index Errors.																									Cattle first seen in fields during last wk of Apr	
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

Rain 23 days - 3.10 inches

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

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

Sum,.....= Sum,.....=

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

Sum,.....= Sum,.....=

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

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

SUMMARY OF THE WINDS.										Calm or Variable.	Mean Force.
Direction.	N	NE	E	SE	S	SW	W	NW			
A.M.	2	2	1	10	2	8	1	3	1		1.10
P.M.	1	2	0	11	2	5	0	2	7		1.58

Dry bulb Thermometer (mean of Cols. 9 and 11),*.....= Highest Reading Self-Registering Thermometer,.....= on the

Wet bulb Thermometer (mean of Cols. 10 and 12),*.....= Lowest do. do.,.....= on the

† Dew-point Temperature,.....= Difference, being Monthly Range,.....=

† Elastic Force of Vapour,.....= Mean of Self-Registering Thermometers,.....=

† Weight of Vapour in a Cubic Foot of Air,.....= Mean Daily Range,.....=

† Additional Weight required to Saturate a Cubic Foot,.....= Greatest Daily Range,.....=

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

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

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

‡ The Diurnal Range for Scotland is as yet unknown.

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

(Signed) Alex^r Crumpebank A.M.(Designation) 12 Rose St Aberdeen

Shade - April

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 Sons 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. It cannot be thus expelled, the instrument is useless till repaired.

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

Meteors. *Arrow Borealis, Remarkable Depression or Elevation of Barometer, Remarkable Falls of Rain, Hail or Snow, Thunder and Lightning*, etc., should be specially noticed, together with the exact hour at which they were first seen, their continuance, and direction. *Building, Leaping, 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 Schönbach's or Moritz's scale and papers are used. They may be had at Messrs Adie and Son's, 50, Princes Street, and at Mr Bryson's, 60, Princes Street, Edinburgh. *Electricity.*—Pith balls suspended by a silk thread, in connection with a metallic conductor, and under cover, and the degrees of a circle being used to express the degree of repulsion, form a cheap and convenient electro-meter. Excited glass or sealing-wax ascertains the nature of the electricity.

OBSERVATIONS IN CONNECTION WITH THE PERIODICAL RETURN OF THE SEASONS.

FOREST TREES.	Flower.	Leaf buds first appear.	In Leaf.	Divested of Leaves.	CROPS, medium variety.	Sowing or Planting.	Appearing above Ground.	In Ear or Flower.	First Cut or Raised.
Alder,.....		3rd Apr			Barley.....	3rd Apr			
Ash,.....		3rd Apr			Beer or Big.....	3rd Apr			
Beech,.....		3rd Apr			Oats.....	3rd Apr			
Birch,.....		3rd Apr			Wheat.....	3rd Apr			
Elm,.....		3rd Apr			Beans.....	3rd Apr			
Larch,.....		3rd Apr			Pease.....	3rd Apr			
Lime,.....		3rd Apr			Turnips.....	3rd Apr			
Oak,.....		3rd Apr			Rye Grass,.....	3rd Apr			
Sycamore or Plane,.....		3rd Apr							
SHRUBS, ETC.	First in Blossom.	FRUITS.	First in Blossom.	First Ripe generally.	MIGRATORY BIRDS.	First Arrival.	Departure.		
Barberry,.....		Apple,.....			Cuckoo,.....	22 Apr			
Bourtree or Elder,.....		Black Currant,.....			Curlew,.....				
Broom,.....		Cherry,.....			House-Swallow,.....				
Hazel,.....		Goat,.....			Lapwing,.....				
Hawthorn,.....		Gooseberry,.....			Plover,.....				
Holly,.....		Peach,.....			Sand-Martin,.....				
Laburnum,.....		Pear,.....			Starling,.....				
Lilac,.....		Plum,.....			Swan,.....				
Mezereum,.....		Strawberry,.....			Rail,.....				
Mountain Ash or Rowan,.....					Other Birds, naming them,.....				
Red Flowering Currant,.....									
Rhododendron Ponticum,.....									
Whin,.....									

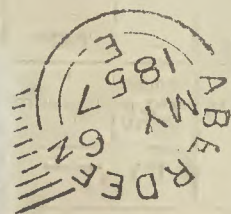
Have the goodness also to state any information you may be able to collect relative to the Crops of Grain, Hay, Potatoes, Turnips, Fruits, etc., whether plentiful, or in perfection; whether any have suffered from blight, disease, etc. Whether Epizootic disease prevails among Cattle; and the Agricultural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

EDINBURGH.

21, Rutland Street.

Sec., Meteorological Society.

DR STARK,



SCOTTISH METEOROLOGICAL SOCIETY.

Observations taken at Aberdeen, County of Aberdeen, in Lat. 57° 9' N, Long. 2° 6' W, Height above Sea 115 feet. mean level of
Distance from Sea 1 1/2 miles. During the MONTH of May 1856.

Days of Month	BAROMETER.				SELF-REGISTERING THERMOMETERS.				HYGROMETER.				WIND.				RAIN.		CLOUD.	SUNSHINE.	THERMOMETERS under Ground.				TEMPERATURE of SPRING & WELL.	TEMPERATURE of SEA.	OZONE.	ELECTRICITY.	GENERAL REMARKS. As to occurrence of Thunder, Lightning, Storms, Hail, Meteors, Remarkable Depression or Elevation of Barometer, etc. Mention the hour at which these began and ended.
	8-44 A.M.		h. P.M.		Max. in Air.	Min. in Air.	Max. Black bulb in Sun.	Min. Black bulb over Grass.	8-45 A.M.		h. P.M.		h. A.M.		h. P.M.		Days on which it fell.	Amount.			h. A.M.								
	Barometer.	Attached Thermometer.	Barometer.	Attached Thermometer.					Dry bulb.	Wet bulb.	Dry bulb.	Wet bulb.	Direction.	Mean Force 1-6.	Direction.	Mean Force 1-6.					3 inches.	12 inches.							
																							inches.	"					
1	30.110	52			52	37			43	41																			
2	164	52			54	38			43	37.5																			
3	324	51			46	33			44	39																			
4	330	52			49	36			45	42																			
5	350	55			50	36			49	44																			
6	300	56			52	40			51	45																			
7	288	57			58	39			49	44																			
8	200	54			51	37			45.5	42																			
9	126	47			49	39			44	42																			
10	100	56			50	40			48.5	45																			
11	076	57			51	40			48.5	45																			
12	056	53			51	41			46.5	45																			
13	080	51			48.5	41			46.5	44																			
14	106	52			47	42			46.5	45																			
15	050	53			54	43			47.5	46.5																			
16	150	58			59	45			54.5	50.5																			
17	29.970	59			61	46			55	53																			
18	874	61			64	39			57	50.5																			
19	700	60			62	44			58.5	53																			
20	546	63			62	49			60	54																			
21	678	63			65	45			55	48																			
22	718	60			59	41			54.5	50.5																			
23	854	59			60	44			57.5	53																			
24	632	61			58	45			57.5	50.5																			
25	674	61			56	45			57.5	49.5																			
26	700	59			56	42			58.5	49.5																			
27	908	59			50				58	49																			
28	902	59			51	41			49	47																			
29	088	60			55	39			50.5	48																			
30	150	55			58	42			50.5	45.5																			
31	226	59			59	43			55	51																			
Sums.	12 13 10 750-490	1712			1703 15	1232			1517	1409 5																			
Means.	927-140 30.85	55.2			54.95	41.1			48.9	45.47																			
* Index Errors.	-0.018																												
Correc- tion for Diurnal Range.†																													
Corrected Means.	24.914 29.977	55.2			54.95	41.1			48.9	45.47																			
No. of Column.	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26			

Barometer, mean corrected reading of Column No. 1 (A.M.),.....=
Diameter of tube.....inch; correction for capillarity to be added,.....+
Sum,.....29.997
Correction for Temperature from Column No. 2 to be deducted,.....=
Sum,.....29.926
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,.....29.914
Temp. from Col. 4,.....=
Sum,.....29.848
Height,.....=
At 32° and Sea-level,.....=29.976
Barometer, Highest observed reading of Month,.....=30.260
Lowest do. do.,.....=29.437
Difference, or Monthly Range,.....=.823

SUMMARY OF THE WINDS.										
Direction.	N	NE	E	SE	S	SW	W	NW	Calm or Variable.	Mean Force.
A.M.	2									
P.M.										

Dry bulb Thermometer (mean of Cols. 9 and 11),.....48.9
Wet bulb Thermometer (mean of Cols. 10 and 12),.....45.4
† Dew-point Temperature,.....41.6
† Elastic Force of Vapour,.....2.64 in.
† Weight of Vapour in a Cubic Foot of Air,.....3.03 grs.
† Additional Weight required to Saturate a Cubic Foot,.....1.24 grs.
† Degree of Humidity (Saturation 100),.....76.
Highest Reading Self-Registering Thermometer,.....64° on the 18th
Lowest do. do.,.....33° on the 3rd
Difference, being Monthly Range,.....31°
Mean of Self-Registering Thermometers,.....48.8
Mean Daily Range,.....13.85°
Greatest Daily Range,.....19°

* If the readings are taken at 9° and 3°, the 9° readings to be alone taken to account, as the correction for Diurnal Range in Scotland is unknown.
† All these calculated from Glaisher's Hygrometric Tables, Second Edition only. 1st Edition.
‡ 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.

Capillarity and Index error, in one sum.

54.9
41.1
2/96.0
48.0
15.8

INSTRUCTIONS FOR MAKING METEOROLOGICAL OBSERVATIONS.

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

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

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

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

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

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

The maximum Registering Thermometer, for taking the extreme heat of the sun's rays, should have its bulb lashed and the surface painted dull, and it should be mounted in a blackened box, whose sides should be so high as to protect the bulb from wind. It should be so placed that the sun's rays have free access to it during the heat of the day. *The minimum Registering Thermometer*, for ascertaining the lowest temperature during the night from radiation, should have its bulb minutely blackened and rendered dull, and be similarly mounted. It should be laid out, about sunset, over grass, in a place freely exposed to the sky, but raised on wooden supports a few inches above the surface, and removed during the day.

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

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

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

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

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

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

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

The temperature of springs or deep wells is recommended to be taken whenever practicable, mentioning whether spring or well, and its depth from the surface. *Meteors, Aurora borealis, remarkable Depressions or Elevations of Barometres, 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 Schönbain's or Mollat's scale and papers are used. They may be had at Messrs. A. D. and Son's, 50, Princes Street, and at Mr. Bryson's, 60, Princes Street, Edinburgh. *Electricity.*—Pith balls suspended by a silk thread, in connection with a metallic conductor, and under cover, and the degrees of a circle being used to express the degree of repulsion, form a cheap and convenient electrometer. Excised glass or sealing-wax ascertains the nature of the electricity.

OBSERVATIONS IN CONNECTION WITH THE PERIODICAL RETURN OF THE SEASONS.

SHRUBS, ETC.	First in Blossom.	FRUITS.	First in Blossom.	First ripe generally.	MIGRATORY BIRDS.	First Arrived.	Departure.
Burberry,		Apple,					
Bouretree or Elder,		Black Currant,					
Broom,		Cherry,					
Hazel,		Gaub,					
Hawthorn,		Gooseberry,					
Holly,		Peach,					
Laburnum,		Pear,					
Lilac,		Plum,					
Mezereum,		Strawberry,					
Mountain Ash or Rowan,							
Red Flowering Currant,							
Rhododendron Ponticum,							
Whin,							

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

METEOROLOGICAL RETURNS.

FOREST TREES.	Flower.	Leaf buds first appear.	In Leaf.	Divided of Leaves.	CROPS, mentioning variety.	Sowing or Planting.	Appearance above Ground.	In Ear or Flower.	First Cut or Rashed.
Allder,					Barley,				
Ash,					Beer or Big,				
Beech,					Potatoes,				
Birch,					Pease,				
Elm,					Wheat,				
Larch,					Oats,				
Lime,									
Oak,									
Sycamore or Plane,									

DR STARR,

To

Sec., Meteorological Society,

21, Rutland Street,

EDINBURGH.

SCOTTISH METEOROLOGICAL SOCIETY.

Observations taken at Aberdeen, County of Aberdeen, in Lat. 57° 5', Long. 2° 7' W, Height above Sea 90 feet.

Distance from Sea 2 miles. During the MONTH of May 1857.

Days of Week.	Days of Month.	BAROMETER.				SELF-REGISTERING THERMOMETERS.				HYGROMETER.				WIND.				RAIN.		CLOUD.	SUNSHINE.	THERMOMETERS under Ground.		Temperature of SPRING or WELL.	Temperature of SEA.	OZONE.	ELECTRICITY.	GENERAL REMARKS, As to occurrence of Thunder, Lightning, Storms, Hail, Meteors, Remarkable Depression or Elevation of Barometer, etc. Mention the hour at which these began and ended.
		h. A.M.		h. P.M.		Max. in Air.	Min. in Air.	Max. Black bulb in Sun.	Min. Black bulb over Grass.	h. A.M.		h. P.M.		Direction.	Mean Force 1-6.	Direction.	Mean Force 1-6.	Days on which it fell.	Amount.			h. A.M.						
		Barometer.	Attach- ed Ther- mometer	Barometer.	Attach- ed Ther- mometer					Dry bulb.	Wet bulb.	Dry bulb.	Wet bulb.									3 inches.	12 inches.					
	1																											10 few drops rain, 2 a little rain, 3 showers of rain
	2																											4 strong, 5 much rain, 6 heavy rain
	3																											2 rain, thunder
	4																											1 rain
	5																											2 rain
	6																											
	7																											
	8																											2 rain
	9																											3 rain
	10																											3 rain, hail
	11																											
	12																											
	13																											4 rain, batha, palus first seen in flood
	14																											3 rain, mist, heard general dark
	15																											2 rain, mist
	16																											3 rain
	17																											
	18																											3 rain
	19																											
	20																											3 rain
	21																											2 rain
	22																											2 rain
	23																											
	24																											3 rain, poles halo
	25																											3 rain, thunder thunder lightning
	26																											3 rain, mist
	27																											2 rain, mist
	28																											
	29																											
	30																											
	31																											
	Sums.													27.25		26.75	19	1.30	222	199	1417	1420	1434					
	Means.													0.87		0.86		thru thorn bush W. Ham- hill 3 miles SW of London	7.16	6.41	45.70	45.80	46.27					
	Index Errors.																											
	Correc- tion 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	

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

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

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

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

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

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

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

SUMMARY OF THE WINDS.										
Direction.	N	NE	E	SE	S	SW	W	NW	Calm or Variable.	Mean Force.
A.M.	2	5	2	10	1	7	0	0	4	0.87
P.M.	1	3	3	10	3	4	0	0	7	0.86

Dry bulb Thermometer (mean of Cols. 9 and 11),*..... Highest Reading Self-Registering Thermometer,..... on the

Wet bulb Thermometer (mean of Cols. 10 and 12),*..... Lowest do. do.,..... on the

† Dew-point Temperature,..... Difference, being Monthly Range,.....

† Elastic Force of Vapour,..... Mean of Self-Registering Thermometers,.....

† Weight of Vapour in a Cubic Foot of Air,..... Mean Daily Range,.....

† Additional Weight required to Saturate a Cubic Foot,..... Greatest Daily Range,.....

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

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

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

‡ The Diurnal Range for Scotland is as yet unknown.

(Signed) Alex^r Bruckthank All

(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.

Wm
H. Allen

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 pressing the instrument, and tapping it gently with the hand. If it cannot be thus expelled, the instrument is useless and requires repair.

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 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.

Self-registering Thermometers and Hygrometers.—These should be placed alongside of each other, in a place freely exposed to the air, but protected from sunning, and from reflected heat, as well as from radiation and from rain, and as near as may be four feet from the general surface of the ground. Different contrivances are used for this purpose, either a double ventilated box with louver-boarded sides, fixed at a north window, and projecting 12 inches from the wall, so as to allow a free current of air to pass between the box and the wall; or in a double meat-safe ventilated box with louver-boarded sides, fixed in an exposed place, and if possible over grass. Whatever means are finally decided on, the position of the instruments should be monitored, 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**, 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 *always to rest on the evening*, so that the temperatures marked by the floats indicate the minimum and the maximum of the day on which the reading is taken. N.B.—The readings of these instruments are taken from that extremity of the float which is nearest the head of the column of mercury or of spirit.

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

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

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

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

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

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

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

Sunshine.—The amount of sunshine may be represented by figures in the fractional form, of which the *denominator* indicates the number of hours from sunrise to sunset, and the *numerator* and set at 6, and during that period none for 3 hours, it would be registered as $\frac{3}{6}$.

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

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

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

Meteors, Aurora Borealis, Remarkable Depression or Elevation of Lightning, etc.—should be specially noticed, together with the exact hour at which they were first seen, their continuance, and direction. **Budding, Leafing, and Flowering of Trees.**—It is necessary to bear in mind that varieties of the same species of tree differ widely in their times of budding and flowering. *Individual trees or shrubs of each kind* should therefore be chosen (if possible early kinds), and their indications should be noted—always the same plant from year to year being noticed.

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

OBSERVATIONS IN CONNECTION WITH THE PERIODICAL RETURN OF THE SEASONS.

FOREST TREES	Flower	Leaf buds first appear	In Leaf	Dissected Leaves	CROPS, mentioning variety	Sowing or Planting	ARRIVING above ground	In Ear or Flower	First Arrival	Departure
Alder	Back May	Back May	Back May	Back May	Barley	Back May	Back May	Back May	13 May	
Aspen	Back May	Back May	Back May	Back May	Beet or Pig	Back May	Back May	Back May	13 May	
Beech	Back May	Back May	Back May	Back May	Peas	Back May	Back May	Back May	13 May	
Birch	Back May	Back May	Back May	Back May	Potatoes	Back May	Back May	Back May	13 May	
Elm	Back May	Back May	Back May	Back May	Turnips	Back May	Back May	Back May	13 May	
Larch	Back May	Back May	Back May	Back May	Wheat	Back May	Back May	Back May	13 May	
Lincoln	Back May	Back May	Back May	Back May	Oats	Back May	Back May	Back May	13 May	
Oak	Back May	Back May	Back May	Back May	Barley	Back May	Back May	Back May	13 May	
Sycamore or Plane	Back May	Back May	Back May	Back May	Barley	Back May	Back May	Back May	13 May	

SHRUBS, ETC.	First in Blossom	Fruit	First in Blossom	Fruit generally	MIGRATORY BIRDS	First Arrival	Departure
Barberry	15 May	Apple	Back May	Back May	Cuckoo	13 May	
Burtree or Elder	15 May	Black Currant	Back May	Back May	Curlew	13 May	
Broom	15 May	Cherry	Back May	Back May	House-Swallow	13 May	
Hazel	15 May	Gean	Back May	Back May	Lapwing	13 May	
Hawthorn	15 May	Gooseberry	Back May	Back May	Peewee	13 May	
Holly	15 May	Peach	Back May	Back May	Sand-Martin	13 May	
Lilac	15 May	Plum	Back May	Back May	Starling	13 May	
Laburnum	15 May	Pear	Back May	Back May	Swan	13 May	
Mezerion	15 May	Strawberry	Back May	Back May	Rail	13 May	
Mountain Ash or Rowan	15 May		Back May	Back May	Other Birds naming them	13 May	
Red Flowering Currant	15 May		Back May	Back May		13 May	
Rhododendron Ponticum	15 May		Back May	Back May		13 May	
Willow	15 May		Back May	Back May		13 May	

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

EDINBURGH

21, Rutland Street,

Sec., Meteorological Society,

DR STARK,

To

Wm
H. Allen

ABLE RDEN
JUN 82
1857

EDINBURGH
JUN 9
1857

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 1/2 miles. During the MONTH of June 1857.

Days of Week.	Days of Month.	BAROMETER.		SELF-REGISTERING THERMOMETERS.				HYGROMETER.				WIND.				RAIN.		CLOUD.	SUNSHINE.	THERMOMETERS under Ground.		Temperature of SPRING or WELL.	Temperature of SEA.	OZONE.	ELECTRICITY.	GENERAL REMARKS. As to occurrence of Thunder, Lightning, Storms, Hail, Meteors, Remarkable Depression or Elevation of Barometer, etc. Mention the hour at which these began and ended.				
		Barometer.	Attach- ed Ther- mometer.	Max. in Air.	Min. in Air.	Max. Black bulb in Sun.	Min. Black bulb over Grass.	Dry bulb.	Wet bulb.	Dry bulb.	Wet bulb.	Direction.	Mean Force 1-6.	Direction.	Mean Force 1-6.	Days on which it fell.	Amount.			3 inches.	12 inches.									
																											h. A.M.		h. P.M.	
																											h.	h.	h.	h.
		inches.	inches.																											
	1	30.100	60	59	43			53.5	49																					
	2	29.900	60	65	42			55	51																					
	3	30.886	60	57	44			53	49.5																					
	4	30.846	62	58	48			57	55																					
	5	30.924	63.5	61	51			62	56.5																					
	6	30.956	67	69	51			65	57																					
	7	30.018	66	68	49			58.5	56																					
	8	29.294	59	58	46			51	50.5																					
	9	30.550	60	53	44			52	47																					
	10	30.476	59	56	45			50	47.5																					
	11	30.770	57	52	41			47	46																					
	12	30.170	57	52	34			49.5	44																					
	13	30.198	61	64	40			58	51																					
	14	30.120	63	63	51			62.5	58																					
	15	30.134	62	68	51			54	51.5																					
	16	30.174	62	60	45			56	52																					
	17	30.200	62	67	47			58.5	52																					
	18	30.350	66	61	47			57	54.5																					
	19	30.372	67	77	47			64	57																					
	20	30.272	63	74	45			56	51.5																					
	21	30.180	65	69	50			57	52.5																					
	22	30.164	64	59	49			55.5	52																					
	23	30.200	68	67	49			67	61																					
	24	30.306	70	73.5	52			62	58																					
	25	30.452	68	67	52			60	58																					
	26	30.278	70	67	52			67	62																					
	27	30.176	71	76	55			65	61																					
	28	29.890	61	70	54			58	55																					
	29	30.770	62	59	46			48.6	46.6																					
	30	30.776	60	53	43			53	47																					
	31																													
	Sums.	900.822	1895.5	1902.5	1903			1713	1579.5																					
	Means.	30.022	63.18	63.41	47.1			57.1	52.96																					
	Index Errors.	0.018																												
	Correc- tion for Diurnal Range.	0.000																												
	Corrected Means.	30.022	63.18	63.41	47.1			57.1	52.96																					
	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			

Min.
1413

Barometer, mean corrected reading of Column No. 1 (A.M.),.....=
Diameter of tube.....inch; correction for capillarity to be added,.....+
Sum,.....30.010
Correction for Temperature from Column No. 2 to be deducted,.....-0.093
Sum,.....29.917
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,.....29.982
Temp. from Col. 4,.....-693
Sum,.....29.889
Height,.....+133
At 32° and Sea-level,.....30.022

Barometer, Highest ^{corrected} observed reading of Month,.....= 30.326 20.452 on 25th
Lowest do. do.,.....= 29.196 29.294 on 8th
Difference, or Monthly Range,.....= 1.130

SUMMARY OF THE WINDS.										
Direction.	N	NE	E	SE	S	SW	W	NW	Calm or Variable.	Mean Force.
A.M.	1	7	1	10	2	7	0	2	0	
P.M.										

Dry bulb Thermometer (mean of Cols. 9 and 11),.....57.1
Wet bulb Thermometer (mean of Cols. 10 and 12),.....52.96
† Dew-point Temperature,.....49.0
† Elastic Force of Vapour,.....3.48 in. 0.376 inch.
† Weight of Vapour in a Cubic Foot of Air,.....3.87 4.35 grs.
† Additional Weight required to Saturate a Cubic Foot,.....1.09 grs.
† Degree of Humidity (Saturation 100),.....74. 79.6

Highest Reading Self-Registering Thermometer,.....77 on the 19th
Lowest do. do.,.....34 on the 12th
Difference, being Monthly Range,.....43
Mean of Self-Registering Thermometers,.....55.25
Mean Daily Range,.....16.31
Greatest Daily Range,.....30

(Signed) Thomas David Gray
(Designation) Student

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Index error and capillarity in one sum.

63.4
47.1
110.5
55.2
16.3

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Barometer.—Barometers of Messrs. Aitke 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 drawn into the cistern by pressing the instrument, and tapping it gently with the hand. If it cannot be thus expelled, the instrument is useless till repaired.

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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 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 always to rest on the reservoir, 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.

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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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Sunshine.—The amount of sunshine may be represented by figures in the fractional form, of which the denominator indicates the number of hours from sunrise to sunset, and the numerator the number of hours from sunrise to sunset, and the number set at 6; and during that period shone for 2 hours, it would be registered as $\frac{2}{6}$.

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

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Ozone.—Mention whether Schönbain's or Mädlé's scale and papers are used. They may be had at Messrs. Aitke and Son's, 30, Princes Street, and at Mr. Bryson's, 60, Princes Street, Edinburgh. **Electricity.**—Pith balls suspended by a silk thread, in connection with a metallic conductor, and under cover, and the degree of a circle being used to express the degree of repulsion, attraction, cheap and convenient electrometer. Etched glass or sealing-wax ascertains the nature of the electricity.

OBSERVATIONS IN CONNECTION WITH THE PERIODICAL RETURN OF THE SEASONS.

FOREST TREES	Flower.	Leaf buds first appear.	In Leaf.	Dissected of Leaves.	CROPS not making variety.	Earlier or Plunder.	Appearances above ground.	In Ear or Harvest.	First Cut or Harvest.
Alder.....					Barley.....				
Ash.....					Beer or Bigg.....				
Beech.....					Oats.....				
Birch.....					Wheat.....				
Elm.....					Beans.....				
Larch.....					Peas.....				
Lime.....					Potatoes.....				
Oak.....					Turnips.....				
Sycamore or Plane.....					Rye Grass.....				

SIRUPS, ETC.	First in Blossom.	FRUITS.	First in Blossom.	Fruit ripe generally.	MIGRATORY BIRDS.	First Arrival.	Departure.
Barberry.....		Apple.....			Cuckoo.....		
Bourtree or Elder.....		Black Currant.....			House-Swallow.....		
Broom.....		Cherry.....			Lapwing.....		
Hazel.....		Gean.....			Plover.....		
Hawthorn.....		Gooseberry.....			Starling.....		
Holly.....		Peach.....			Swan.....		
Lilac.....		Pear.....			Other Birds, naming them.....		
Mezerion.....		Plum.....					
Mountain Ash or Rowan.....		Strawberry.....					
Rhododendron Ponticum.....							
Whin.....							

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

METEOROLOGICAL RETURNS.

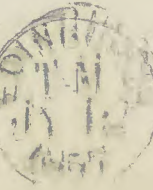
EDINBURGH.

21, Rutland Street,

Sec., Meteorological Society,

DR STARK,

To (H)



SCOTTISH METEOROLOGICAL SOCIETY.

Observations taken at Aberdeen, County of Aberdeen, in Lat. 57° 9', Long. 2° 7', Height above Sea 90 feet.

Distance from Sea 2 miles.

During the MONTH of June 1857.

Days of Week.	Days of Month.	BAROMETER.				SELF-REGISTERING THERMOMETERS.				HYGROMETER.				WIND.				RAIN.		CLOUD.	SUNSHINE.	THERMOMETERS under Ground.				Temperature of SPRING or WELL.	Temperature of SEA.	OZONE.	ELECTRICITY.	GENERAL REMARKS, As to occurrence of Thunder, Lightning, Storms, Hail, Meteors, Remarkable Depression or Elevation of Barometer, etc. Mention the hour at which these began and ended.
		h. A.M.		h. P.M.		Max. in Air.	Min. in Air.	Max. Black bulb in Sun.	Min. Black bulb over Grass.	h. A.M.		h. P.M.		Direction.	Mean Force 1-6.	Direction.	Mean Force 1-6.	Days in which it fell.	Amount.			h. A.M.								
		Barometer.	Attached Thermometer.	Barometer.	Attached Thermometer.					Dry bulb.	Wet bulb.	Dry bulb.	Wet bulb.									3 inches.	12 inches.							
																								inches.	"					
	1																			2	17	49.5	50	48.5				1st drops rain, 2nd little rain, 3rd showers, 4th rain		
	2																			4	12	49	50	49						
	3																			7	8	50	50.5	49.5						
	4																			7	7	51.5	50.5	50				2 rain, fields began to be yellow with milk		
	5																			7	8	51.5	50.5	50				3 rain		
	6																			7	8	51.5	54	49.5						
	7																			6	8	54	53	50				3 rain, thunder		
	8																			9	2	53	54	50				2 rain		
	9																			10	0	50.5	53.5	50				4 rain		
	10																			9	0	49	51	50				2 rain, Veronica peccabunga & V. ciliata		
	11																			9	0	50	51	50				2 rain		
	12																			3	7	48	50	50				2 rain		
	13																			4	16	45.5	49.5	50						
	14																			7	8	47	49	49.5				2 rain		
	15																			6	10	52	50	50						
	16																			10	10	54	52	49.5				1 rain		
	17																			3	17	51.5	52	50						
	18																			4	12	52	52	50				Poa fluitans first in flower		
	19																			2	12	53	52	50				last batch of purple snowdrops appeared		
	20																			1	16	53.5	53	50.5				mustill		
	21																			2	17	54	53	50.5				must still		
	22																			6	8	54.5	54	50.5				must night		
	23																			3	11	53	54	50.5				must night		
	24																			2	17	53	54.5	51				must night, thunder		
	25																			4	12	57.5	55.5	51				must still, thunder		
	26																			10	0	57	55.5	51.5				must, 1 rain		
	27																			7	8	57	56	52.5				1 rain, thunder, lightning		
	28																			9	0	58.5	56.5	53				thunder		
	29																			9	2	57	56	53				2 rain		
	30																			10	0	52	55	53				4 rain		
	31																			6	14	51	53.5	53				Benmuckdhu range of mountains so		
																													20 miles inland white with new fallen snow	
	Sums.														21.10		18.40	14	2.10	179	259	1575	0	1830	5	1515	5			
	Means.														0.70		0.60		thony	6	8.6	52.7	52	50.5						
	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			

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

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

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

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

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

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

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

SUMMARY OF THE WINDS.										
Direction.	N	NE	E	SE	S	SW	W	NW	Calm or Variable.	Mean Force.
A.M.	0	9	0	9	2	4	0	2	4	0.70
P.M.	0	8	1	8	3	2	0	2	9	0.65

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

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

† 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,..... on the.....

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

Difference, being Monthly Range,.....

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

Mean Daily Range,.....

Greatest Daily Range,.....

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

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

‡ The Diurnal Range for Scotland is as yet unknown.

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

(Signed) Alex Bruckshank & Co

(Designation) 12 Rose Street Aberdeen

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

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

The corrections necessary to be applied to the barometric readings depend on the form of the instrument. The mode of making these corrections, and the tables employed for the purpose, will be found in the "Report of the Committee of the Royal Society on Physics and Meteorology," 1849, price 1s. The daily readings of the Barometer ought to be entered on the Schedule as read off, and the corrections only applied to the mean for the month. **Self-Registering Thermometers and Hygrometers.**—These should be placed alongside of each other, in a place freely exposed to the air, but protected from sunshine, and from reflected heat, as well as from radiation and from rain, and as near as may be four feet from the general surface of the ground. Different contrivances are used for this purpose, either a double ventilated box with louver-boarded sides, fixed at a north window, and projecting 12 inches from the wall, so as to allow a free current of air to pass between the box and the wall; or in a double metal-side ventilated box with louver-boarded sides, fixed in an exposed place, and if possible over grass. Whatever means are finally decided on, the position of the instruments should be mentioned, and should not be changed (without due notice being given to the Secretary), in order that the results of one month's observations may be strictly comparable with those of another.

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

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

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

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

Wind.—Isolated wind-vanes or weather-cocks are apt to give false indications of the general direction of the wind, in consequence of the currents of air at the surface of the ground being so much influenced by the neighbourhood of hills, valleys, buildings, etc. Where low clouds are seen drifting along, their direction in reference to known objects, or as noted by means of a mirror on which a compass may be laid, or by means of a circular mirror fixed over the centre of a pocket compass, will, in general, give the true direction of the current of air near the earth's surface. The motion of the clouds, the general direction of the smoke of a hamlet or village, or of a tall chimney, gives a better indication of the general direction of the wind than any wind-vane. The observer should state whether he has ascertained the direction by reflection or otherwise. It is generally agreed to reckon the force of the wind from 0 to 6; the latter being the severest hurricane in this island.

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

Sunshine.—The amount of sunshine may be represented by figures in the fractional form, of which the denominator indicates the number of hours from sunrise to sunset, and the numerator the number of hours the sun shines. Thus, if the sun rose at 6 and set at 6, and during that period shone for 2 hours, it would be registered as $\frac{2}{12}$.

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

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

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

Meters, Anemometers, Barometers, Depressors or Elevators of Lightning, etc. should be specially noticed, together with the exact hour at which they were first seen, their continuance and direction.

Birding, Leafing, and Flowering of Trees.—It is necessary to bear in mind that varieties of the same species of tree differ widely in their times of leafing and flowering. *Indications* of 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 Schönbach's or Mollat's scale and papers are used. They may be had at Messrs. Aile and Son's, 50, Princes Street, and at Mr. Bryson's, 60, Princes Street, Edinburgh. **Electricity.**—Fifth balls suspended by a silk thread, in connection with a metallic conductor, and under cover, and the degrees of a circle being used to express the degree of repulsion, form a cheap and convenient electrometer. Excited glass or sealing-wax ascertains the nature of the electricity.

OBSERVATIONS IN CONNECTION WITH THE PERIODICAL RETURN OF THE SEASONS.

FOREST TREES.	SHRUBS, ETC.	First in Blossom.	FRUITS.	First in Blossom.	CROPS, including variety.	Spring or Planting.	Approaching above Ground.	First Out or Raised.
Barberry,	Apple, .....	.....	.....	.....	Barley, .....	.....	.....	.....
Bourtree or Elder,	Black Currant, .....	.....	.....	.....	Beer or Big, .....	.....	.....	.....
Broom,	Cherry, .....	.....	.....	.....	Oats, .....	.....	.....	.....
Hazel,	Gean, .....	.....	.....	.....	Wheat, .....	.....	.....	.....
Hawthorn,	Gooseberry, .....	.....	.....	.....	Beans, .....	.....	.....	.....
Holly,	Peach, .....	.....	.....	.....	Peas, .....	.....	.....	.....
Lilac,	Pear, .....	.....	.....	.....	.....	.....	.....	.....
Mezereum,	Plum, .....	.....	.....	.....	.....	.....	.....	.....
Mountain Ash or Rowan,	Strawberry, .....	.....	.....	.....	.....	.....	.....	.....
Red Flowering Currant, .....	.....	.....	.....	.....	.....	.....	.....	.....
Rhododendron Ponticum, .....	.....	.....	.....	.....	.....	.....	.....	.....
Willow, .....	.....	.....	.....	.....	.....	.....	.....	.....

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

METEOROLOGICAL RETURNS.

EDINBURGH.

21, Rutland Street,

Sec., Meteorological Society.

DR STARK,

To

ABE
RDF
6
1857
G

SCOTTISH METEOROLOGICAL SOCIETY.

Observations taken at Aberdeen, County of Aberdeen, in Lat. 57° 9' N, Long. 2° 6' W, Height above Sea 115 feet. *the mean level of the*
Distance from Sea 1 1/2 miles. During the MONTH of July 1857.

Days of Week.	Days of Month.	BAROMETER.				SELF-REGISTERING THERMOMETERS.				HYGROMETER.				WIND.				RAIN.		CLOUD.	SUNSHINE.	THERMOMETERS under Ground.		TEMPERATURE of SPRING or WELL.	TEMPERATURE of SEA.	OZONE.	ELECTRICITY.	GENERAL REMARKS. As to occurrence of Thunder, Lightning, Storms, Hail, Meteors, Remarkable Depression or Elevation of Barometer, etc. Mention the hour at which these began and ended.	
		2 1/2 h. A.M.		h. P.M.		Max. in Air.	Min. in Air.	Max. Black bulb in Sun.	Min. Black bulb over Grass.	2 1/2 h. A.M.		h. P.M.		h. A.M.		h. P.M.		Days on which it fell.	Amount.			h. A.M.							
		Barometer.	Attach- ed Ther- mometer	Barometer.	Attach- ed Ther- mometer					Dry bulb.	Wet bulb.	Dry bulb.	Wet bulb.	Direction.	Mean Force 1-6.	Direction.	Mean Force 1-6.					3 inches.	12 inches.						
																													inches.
1		29.950	60			61	40			55	49																		
2		30.000	61			67	43			60	52																		
3		29.826	64			72	51			60.5	54																		
4		29.680	64			64	57			62.5	59																		
5		29.630	67			70	54.5			57.5	55																		
6		29.562	64			61	50			54	52.5																		
7		29.710	60			56	45			51.5	49.5																		
8		29.800	58			56	45			51	47																		
9		29.764	57			55	44			52	48																		
10		29.780	60			57	42			54.5	48																		
11		29.800	63			67	52			61.8	56																		
12		29.962	67			70	54			61	59																		
13		30.026	65			72	54			59.5	59																		
14		30.200	68			71	51			64	53.5																		
15		29.928	69			69	51			62.5	56																		
16		29.700	67			68	48			61.5	52																		
17		29.850	64			69	45			59	51.5																		
18		30.072	65			69	51			58.5	54																		
19		30.062	68			71	51			66	57																		
20		29.900	73			69	55			66.5	62																		
21		29.800	67			73.5	48			58.5	54																		
22		29.794	66			68	50			64	53.5																		
23		29.720	66			63	52			60.5	55																		
24		29.350	64			65	55			62.5	58																		
25		29.324	64			68.5	51			60	55																		
26		29.650	67			68	48			62	56																		
27		29.550	65			67	48			59	55																		
28		29.750	66			68	45			60.5	52																		
29		29.940	67			67	53			62	57																		
30		29.738	65			72	52			59	47																		
31		29.770	67			70	52			64	56																		
Sums.		923.64	2008			2064	1531.5			1853.5	1674.5																		
Means.		29.795	64.77			66.58	49.4			59.8	54.01																		
Index Errors.		-0.08																											
Correc- tion for Diurnal Range.†																													
Corrected Means.		29.777	64.77			66.58	49.4			59.8	54.01																		
No. of Column.		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26		

Barometer, mean corrected reading of Column No. 1 (A.M.),.....=
Diameter of tube _____ inch; correction for capillarity to be added,.....+
Sum,.....
Correction for Temperature from Column No. 2 to be deducted,.....=
Sum,.....
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,.....
Height,.....=+
At 32° and Sea-level,.....=

Barometer, Highest observed reading of Month,.....=
Lowest do. do.,.....=
Difference, or Monthly Range,.....=

SUMMARY OF THE WINDS.									
Direction.	N	NE	E	SE	S	SW	W	NW	Mean Force.
A.M.									
P.M.									

Dry bulb Thermometer (mean of Cols. 9 and 10)*.....
Wet bulb Thermometer (mean of Cols. 10 and 11)*.....
† 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,.....
Lowest do. do.,.....
Difference, being Monthly Range,.....
Mean of Self-Registering Thermometers,.....
Mean Daily Range,.....
Greatest Daily Range,.....

(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.

66.5
49.4
2 115.9
57.9

17.1

These points will 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 that of 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 :

These points were kindly furnished. 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 that 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 recommended 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.

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. D

The conditions necessary to be applied to the bromometric method are dependent on the form of the instrument. The mode of making these corrections, and the tables employed for the purpose, will be described in the Report of the Committee of the Royal Society on the subject of the use of the instrument, published in 1840, page 18. The daily readings of the bromometer ought to be entered on the Schedule as *read*, and the corrections only applied to the mean for the month. *Schäfferstén's Thermometers and Hygrometers*.—These should be placed alongside of each other, in a place freely exposed to the sun, and protected from rain, and from reflected heat, as far as possible, and from radiation and from wind, and as near as may be *four feet* from the general surface of the ground. Different countries have different forms of these instruments, but all have a north window, and project about 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-stand, and it possible over grass. Whatever means are finally adopted, the instrument should be so placed that the thermometer should not be damaged (without the notice being given to the Secretary), in order that the results of one month's observations be strictly comparable with those of another.

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

The *maximum* registering thermometer taking the extreme heat of the sun's rays, should have its bulb braced and to the surface enclosed shut, and it should be placed 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 braced and to the surface enclosed shut, and be similarly windproof. It should be laid out, about sunrise, over grass, in a place freely exposed to the sky, but raised on wooden supports a few inches above the surface, and removed during the day.

only possible when the *wat* still requires the mushin covering it to be often changed. In towns over a month, or fifteen, if the leather is dusty, and the mushin gets foul: in the country wherever the mushin seems to be foul. The bulb should be covered with thin tissue or blotting paper below the mushin, and, before being used: and the cotton wick which conducts moisture to the tip 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 Gangs—As "Overcoming's Rain Gangs" seem to possess several advantages over others, the Society gives the preference to them; but whatever form to be employed, in order that all the stations may yield comparable results, it is recommended that the Rain Gangs be sown 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 close as possible from trees, houses, high walls, and other obstructions or broken ground. When more than one Rain Gang is to be sown, it should be placed near each other, but at different heights about the ground, and their indications noted in the general remarks, mentioning their height above ground—the regular column in the Schedule being reserved for the ground Rain Gang alone.

Notes.—Isolated wind-vanes or weathervanes are apt to give false indications of the general direction of the wind, in consequence of the currents of air at the surface of the ground being so much influenced by the neighbourhood of hills, valleys, buildings, &c. Where low clouds are seen drifting along their direction in reference to known objects, or as noted by means of a mirror on which a compass may be laid, or by means of a circular arrow fixed over the centre of a pocket compass, will, in general, give the true direction of the current of air near the earth's surface. The notion of the higher strata of clouds gives no such indication. Rifting 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 observation of the state whether it has ascended the direction of reflection or otherwise. It generally agreed to reckon the force of the wind from 0 to 10; the latter being the severest hurricanes in this island.

Clouds.—The Society recommends observers to adopt the Howard nomenclature of clouds. The scale of cloud in the visible sky is reckoned from 0 to 10. Thus, a sky quite free

from column 1; a sky half covered with clouds is 5; and the whole visible sky covered with clouds is 10. Clouds often cover the sky in forms or even more of the visible sky without obstructing the sun, so that the indications noted in the column for "obscured sun" are not applicable to the column for "obscured moon." As the full moon, *as full as a bowl*, is brought by some eminent astronomers to have a powerful effect in dispersing any fogs bearing on this point, for a few days (or perhaps, as the case may be) before and after every full moon; and the same variations ought to be made at the periods of new moon.

Sunshine. The amount of sunshine may be represented by figures in the fractional form, of which the *denominator* indicates the number of hours from sunrise to sunset, and the *numerator* the number of hours the sun shines. Thus, if the sun rose at 6₀ and set at 6₀, and during that period shone for 3 hours, it would be registered as $\frac{3}{12}$.

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

Leptothorax of the Sea.—As the interior of the island is a vast, level, unbroken expanse of water, the temperature of the ocean which surrounds it, the Society strongly recommends that the temperature of the sea at a depth of 6 feet or 1 fathom should be taken at every place round the coast, where there is any anchorage. Thermometers, with its bulb fixed in a small tin vessel, covered with a sponge, and with a weight attached, is sunk to the required depth, and in ten minutes drawn up and read. Convenient and cheap instruments are furnished by Messrs. Adie and Son, and Mr. Bryson, Edinburgh.

the temperance of springs or deep wells is recommended to taken whenever, practically, mentioning whether spring or well, and its depth from the surface.

Altebras, Ayrón, Borealis, Remissible Depression or Elevation of the Atmosphere, Remissible Falls of Rain, Heat or Snow, Thunder and Lightning, etc., should be specially noticed, together with the exact direction in which they were first seen, their continuance, and direction.

Bridging, Leaping, and Flooding of Trees.—It is necessary to bear in mind that varieties of the same species of tree differ widely in their modes of leading and howening. *Individual* trees or shrubs of each kind should therefore be chosen (if possible early thins), and their indications should be chosen (always the same) from year to year being noticed.

Quæstio.—Motion whether Scholton's or Moffat's scales and weights are used. They may be had at Messrs Alder and Sons's, 50, Abchurch Lane, London; or at Messrs W. and A. Goss's, 60, Cannon Street, and at Mr Bryson's, 6, Prince Street, Edinburgh.

Electricity.—Pith balls suspended by a silk thread, in connection with a metallic conductor, and under cover, and the degrees of attraction and repulsion being used to express the degree of ignition, form a simple and convenient electrometer. Excited glass or sealing-wax, and the nature of the electricity.

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,			Catbird,		
Broom,		Cherry,			House-Swallow,		
Hazel,		Gum,			Lapwing,		
Hawthorn,		Gooseberry,			Plover,		
Holly,		Peach,			Sand-Martin,		
Laburnum,		Pear,			Starling,		
Lilac,		Plum,			Swan,		
Mezerion,		Strawberry,			Rail,		
Mountain Ash or Rowan,					Other Birds, naming them—		
Red Flowering Currant,							
Rhododendron Ponticum,							
Whin,							

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

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.

July
1891
L. T.

DR STARK,

Sec., Meteorological Society.

21. Rutland Street

EDINBURGH.

METEOROLOGICAL RETURNS

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SCOTTISH METEOROLOGICAL SOCIETY.

Observations taken at Aberdeen, County of Aberdeen, in Lat. 57° 9', Long. 2° 7' W, Height above Sea 90 feet.
Distance from Sea 2 miles. During the MONTH of July 185 .

Days of Week.	Days of Month.	BAROMETER.				SELF-REGISTERING THERMOMETERS.				HYGROMETER.				WIND.				RAIN.		CLOUD.	SUNSHINE.	THERMOMETERS under Ground.		TEMPERATURE of SPRING or WELL.	TEMPERATURE of SEA.	OZONE.	ELECTRICITY.	GENERAL REMARKS. As to occurrence of Thunder, Lightning, Storms, Hail, Meteors, Remarkable Depression or Elevation of Barometer, etc. Mention the hour at which these began and ended.
		h. A.M.		h. P.M.		Max. in Air.	Min. in Air.	Max. Black bulb in Sun.	Min. Black bulb over Grass.	h. A.M.		h. P.M.		h. A.M.		h. P.M.		Days on which it fell.	Amount.			h. A.M.						
		Barometer.	Attach- ed Ther- mometer	Barometer.	Attach- ed Ther- mometer					Dry bulb.	Wet bulb.	Dry bulb.	Wet bulb.	Direction.	Mean Force 1-6.	Direction.	Mean Force 1-6.					3 inches.	12 inches.					
1														var	0.25	var	0.25	0		4	16	49	52.5	53			1 few drops rain, 2 little rain, 3 shower	
2														var	0.25	var	0.25	0		6	12	52	53	53			2 rain	
3														S W	1	S W	1	1		10	3	54	54	53			3 —	
4														S W	0.25	var	0.26	1		8	7	53	54	53			3 — thunder.	
5														N	0.25	N E	0.25	1		10	0	57	53	53.5			4 —	
6														N	4	N	4	1		10	0	54	53	53.5			4 —	
7														N W	9	N W	4	1		9	0	51	53	53			3 —	
8														N W	4	N W	9	1		8	3	50	52	53			2 —	
9														N W	4	N W	2.25	1		8	2	49	52	53			3 —	
10														N W	2.25	S W	0.25	0		7	9	49.5	51	53				
11														S W	1	S W	0.25	1		7	10	57	52	53			2 rain	
12														S W	1	N	0.25	0		7	8	53	53	53				
13														var	1	N	0.25	1		6	12	53	54	53			3 rain	
14														S W	1	S W	1	1		6	10	53	54.5	53			1 —	
15														S W	2.25	S W	1	1		7	9	53	54.5	53			3 —	
16														S W	2.25	var	0.26	1		7	12	54	53	53			3 —	
17														N	0.25	var	0.26	1		8	5	53.5	54	53			3 —	
18														S E	0.25	S E	0.25	0		6	14	54	54	53.5				
19														S W	0.25	S W	0.25	0		8	3	56.5	54.5	53.5				
20														S W	0.25	var	0.25	1		7	6	57	53	54			3 rain	
21														N	0.25	N W	0.25	1		7	9	53	53.5	53.5			3 — 2 hail thunder	
22														N W	1	N W	1	1		7	8	53	53	54			3 —	
23														S W	1	S W	0.25	1		8	5	53	53	54			3 —	
24														S W	4	S W	0.25	0		8	4	56.5	53.5	54				
25														S W	9	N	9	0		3	15	53	55	54				
26														S W	2.25	S W	0.25	0		8	7	52.5	54.5	54				
27														S W	0.25	N	0.25	1		7	9	54.5	54.5	54			3 rain thunder lightning	
28														N W	2.25	N W	1	1		7	8	53	54.5	54			3 —	
29														S W	1	S W	1	0		7	11	53.5	55	54				
30														S W	1	N W	1	1		7	9	56	53	54			3 rain	
31														S W	1	N W	2.25	1		6	12	56	53.5	54			2 —	
Sums.														55.5		50.6	22	145		224	238	1672	5167	1656	5			
Means.														1.8		1.6		5.4		7.2	7.6	53.9	54.1	53.4				
Index Errors.																												
Correc- tion 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	

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

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

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

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

Capillarity,.....= +

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

Sum,.....

Sum,.....

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

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

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

Sum,.....

Sum,.....

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

Height,.....= +

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

At 32° and Sea-level,.....=

SUMMARY OF THE WINDS.

Direction.	N	NE	E	SE	S	SW	W	NW	Calm or Variable.	Mean Force.
A.M.	2	0	0	1	0	17	2	6	3	1.8
P.M.	1	1	0	1	0	10	4	8	6	1.6

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

Highest Reading Self-Registering Thermometer,.....on the.....

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

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

† Dew-point Temperature,.....

Difference, being Monthly Range,.....

† Elastic Force of Vapour,.....

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

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

Mean Daily Range,.....

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

Greatest Daily Range,.....

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

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

(Signed) Alex Bruckshaw

(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.

INSTRUCTIONS FOR MAKING METEOROLOGICAL OBSERVATIONS.

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

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

Barometer.—Barometers of Messrs. A. D. and Son's construction are recommended; but any instruments may be used which have adjustable surfaces, and have been compared. Before this instrument is suspended for use it should be examined, in order to ascertain whether the space above the mercury is free from air. This is done by inclining the instrument somewhat from the vertical position, when, if free from air, the mercury will 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 a 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 metal, or the proximity of the person, are apt to influence its readings.

The correction 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 of Physics and Meteorology," 1840, p. 105. The daily readings of the Barometer ought to be entered on the Schedule as read off, and the corrections only applied to the mean for the month.

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

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

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

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

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

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

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

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

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

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

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

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

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

Meteors, Aurora Borealis, Remarkable Depression or Elevation of Barometer, Remarkable Falls of Rain, Hail or Snow, Thunder and Lightning, etc., should be specially noticed, together with the exact hour at which they were first seen, their continuance and direction. *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.

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

OBSERVATIONS IN CONNECTION WITH THE PERIODICAL RETURN OF THE SEASONS.

SHRUBS, ETC.	First in Blossom.	FRUITS.	First in Blossom.	CROPS, mentioning variety.	Sowing or Planting.	Appearing above Ground.	First Cut or Raised.	Departure
Barberry,		Apple,		Burley,				
Bourtree or Elder,		Black Currant,		Beer or Big,				
Broom,		Cherry,		Oats,				
Hazel,		Gooseberry,		Wheat,				
Hawthorn,		Geat,		Peas,				
Holly,		Pear,		Beans,				
Laburnum,		Strawberry,		Plum,				
Lilac,				Black Currant,				
Mezerion,				Cherry,				
Mountain Ash or Rowan,				Gooseberry,				
Red Flowering Currant,				Pear,				
Rhododendron Ponticum,				Strawberry,				
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.

Sec., Meteorological Society,

DR STARK,

(H)



SCOTTISH METEOROLOGICAL SOCIETY.

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

Distance from Sea 1 1/2 miles. During the MONTH of August 1857.

Days of Week	Days of Month	BAROMETER.				SELF-REGISTERING THERMOMETERS.				HYGROMETER.				WIND.				RAIN.		CLOUD.	SUNSHINE.	THERMOMETERS under Ground.		Temperature of SPRING or VEIL.	Temperature of SEA.	OZONE.	ELECTRICITY.	GENERAL REMARKS. As to occurrence of Thunder, Lightning, Storms, Hail, Meteors, Remarkable Depression or Elevation of Barometer, etc. Mention the hour at which these began and ended.
		h. A.M.		h. P.M.		Max. in Air.	Min. in Air.	Max. Black bulb in Sun.	Min. Black bulb over Grass.	h. A.M.		h. P.M.		h. A.M.		h. P.M.		Days on which it fell.	Amount.			h. A.M.						
		Barometer.	Attach- ed Ther- mometer	Barometer.	Attach- ed Ther- mometer					Dry bulb.	Wet bulb.	Dry bulb.	Wet bulb.	Direction.	Mean Force 1-6.	Direction.	Mean Force 1-6.					3 inches.	12 inches.					
		29.850	68			74	55			64	60																	
		30.000	67			71	51			61	55																	
		29.801	68			71	50			65	61																	
4		29.742	69			71	50			64	58																	
5		29.920	67			72	48			61	54																	
6		29.932	68			66.5	47.5			58	54																	
7		29.928	65			61	50			56	52																	
8		29.828	62			59	48			53.5	52.5																	
9		29.886	61			57	40			56	53																	
10		29.940	63			61	48			61	56																	
11		29.924	65			63	49			63	60																	
12		30.104	67			69	51			61	55.5							.40										
13		29.830	66			67	49			61.5	57.5																	
14		29.850	66			66.5	48			57	56							.65										
15		29.980	65			60	49			61	60																	
16		30.160	70			64	57			64	61																	
17		30.128	65			66	46			57	55.5																	
18		30.100	68			64	53			59	56																	
19		30.150	70			70.5	56			70.5	65.5																	
20		30.312	71			74	58			62.5	60.5							.01										
21		30.280	66			65	53			60.5	59							.02										
22		30.150	65			68	48			62	59							.01										
23		30.086	68			66	55			62	66							.02										
24		30.042	70			69	56			65	61																	
25		20.000	69			66	53			63	60																	
26		30.092	71			68	56			66	60																	
27		30.250	69			73	53			62	55.5																	
28		30.370	67			65	49			57	52																	
29		30.336	66			62	43			55	53																	
30		30.150	66			62	47			59.5	52.5																	
31		30.044	65			62	48			58	52																	
	Sums.	931.035	2073			2053	1573.5			1886	1767							1.11										
	Means.	30.033	66.87			66.22	50.76			60.84	57																	
	Index Errors.	* .018																										
	Correc- tion for Diurnal Range.†	30.015	66.87			66.22	50.76			60.84	57																	
	Corrected Means.	30.015	66.87			66.22	50.76			60.84	57																	
	No. of Column.	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	

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

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

Sum,..... 30.015

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

Sum,..... 29.912

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

Barometer corrected and reduced to 32° and Sea-level,.....= 29.912

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

Capillarity,.....= +

Sum,.....

Temp. from Col. 4,.....=

Sum,..... 29.912

Height,.....= +

At 32° and Sea-level,.....= 30.045

*corrected

Barometer, Highest observed reading of Month,.....= 30.247

Lowest do. do.,.....= 29.632

Difference, or Monthly Range,.....= .615

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),*..... 60.8

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

† Dew-point Temperature,..... 53.7

† Elastic Force of Vapour,..... .412 inch

† Weight of Vapour in a Cubic Foot of Air,..... 4.628 grs

† Additional Weight required to Saturate a Cubic Foot,..... 1.23 grs

† Degree of Humidity (Saturation 100),..... 78.

Highest Reading Self-Registering Thermometer,..... 74

Lowest do. do.,..... 43

Difference, being Monthly Range,..... 31

Mean of Self-Registering Thermometers,..... 58.48

Mean Daily Range,..... 15.46

Greatest Daily Range,..... 24

(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

66.2
50.7
116.9
58.4

155

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 instrument 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 slight 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 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 reading of the Barometer ought to be entered on the Schedule as read off, and the corrections only applied to the mean for the month.

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

The *Self-Registering Thermometer* 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 readings are taken. N.B.—The readings of these instruments are taken from that extremity of the float which is nearest the *head of the column* of mercury or of spirit.

The *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 wherever the muslin seems to be foul. The bulb should be covered with thin tissue or blotting paper below the muslin, and the muslin should always be thoroughly wetted, and freed from starch, before being used; and the cotton wick which conducts moisture to it should be previously soaked in a solution of washing soda, and then in pure water, before being attached, in order that

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

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

Winds.—Isolated wind-vanes or weather-cocks are apt to give false indications of the general direction of the wind, in consequence of the currents of air at the surface of the ground being so much influenced by the neighbourhood of hills, valleys, buildings, etc. Where low clouds are seen drifting along, their direction in reference to known objects, or as noted by means of a mirror on which a compass may be laid, or by means of a circular mirror fixed over the centre of a pocket compass, will, in general, give the true direction of the current of air near the earth's surface. The motion of the clouds, the general direction of the smoke of a hamlet or village, or of a tall chimney, gives a better indication of the general direction of the wind than any wind-vane. The observer should state whether he has ascertained the direction by reflection or otherwise. It is generally agreed to reckon the force of the wind from 0 to 6; the latter being the severest hurricane in this island.

Clouds.—The Society recommends observers to adopt the Howard nomenclature of clouds. The scale of cloud in the visible sky is reckoned from 0 to 10. A sky of cloud in free from cloud is 0; a sky half covered with cloud is 5; and the whole visible sky covered with cloud is 10. Clouds often cover three-fourths or even more of the visible sky without obstructing the sunning, so that the indications noted in the column for clouds would not necessarily express, or agree with, the column for sunning. As the full moon, so long as it is above the horizon, is thought by some eminent astronomers to have a powerful effect in dissipating clouds, it would be well to note in the general observation 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.

Sun's size.—The amount of sunshine may be represented by figures 1 to 10, the fractional form of which the *anemometer* indicates the number of hours from sunning to sunset, and the *anemometer* the number of hours the sun shines. Thus, if the sun rose at 6 and set at 6, and during this period shone for 5 hours, it would be registered as $\frac{5}{10}$.

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

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

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

Meteors, Aurora Borealis, Comets, Halley's Comet, Depression or Elevation of Barometer, Remarkable Falls of Rain, Hail or Snow, Thunder and Lightning, etc. should be specially noticed, together with the exact hour at which they were first seen, their continuance, and direction. *Birding, Leafing, and Flowering of Trees.*—It is necessary to bear in mind that varieties of the same species of tree differ widely in their times of leafing and flowering. *Individual trees or shrubs of each kind should therefore be chosen (if possible early kinds), and their indications should be alone noted—always the same plant from year to year being noticed.*

Grass.—Mention whether Scotch or Mr. Adie's scale and papers are used. They may be had at Messrs. Adie and Son's, 50, Princes Street, and at Mr. Bryson's, 46, Princes Street, Edinburgh. *Electricity.*—Pitch balls suspended by a silk thread, in connection with metallic conductors, and under cover, and the degree of a circle being used to express the degree of repulsion, form a cheap and convenient electrometer. Excited glass or sealing-wax ascertains the nature of the electricity.

OBSERVATIONS IN CONNECTION WITH THE PERIODICAL RETURN OF THE SEASONS.

FOREST TREES.	Flower.	Leaf buds first appear.	In Leaf.	Dissected of Leaves.	CROPS, mentioning variety.	Seeding or Planting.	Age when above ground.	In Ear or Flower.	First Out or Harvest.
Allder,.....					Barley,.....				
Ash,.....					Beer or Big,.....				
Beech,.....					Peas,.....				
Birch,.....					Potatoes,.....				
Elm,.....					Turnips,.....				
Larch,.....					Wheat,.....				
Lime,.....					Oats,.....				
Oak,.....					Bye Grass,.....				
Sycamore or Plane,.....									

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

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

METEOROLOGICAL RETURNS.

EDINBURGH.

21, Rutland Street,

Secy, Meteorological Society,

DR STARK.

To Mr. Adie

AUG 1857



SCOTTISH METEOROLOGICAL SOCIETY.

Observations taken at Abadeen, County of Abadeen, in Lat. 57° 9', Long. 2° 7' W, Height above Sea 90 feet.

Distance from Sea 2 miles. During the MONTH of August 1857.

Days of Week.	Days of Month.	BAROMETER.				SELF-REGISTERING THERMOMETERS.				HYGROMETER.				WIND.				RAIN.		CLOUD.	SUNSHINE.	THERMOMETERS under Ground.		TEMPERATURE OF SPRING OR WET.	TEMPERATURE OF SEA.	OZONE.	ELECTRICITY.	GENERAL REMARKS. As to occurrence of Thunder, Lightning, Storms, Hail, Meteors, Remarkable Depression or Elevation of Barometer, etc. Mention the hour at which these began and ended.				
		h. A.M.		h. P.M.		Max. in Air.	Min. in Air.	Max. Black bulb in Sun.	Min. Black bulb over Grass.	h. A.M.		h. P.M.		h. A.M.		h. P.M.		Days on which it fell.	Amount.			h. A.M.							h. P.M.			
		Barometer.	Attach- ed Ther- mometer.	Barometer.	Attach- ed Ther- mometer.					Dry bulb.	Wet bulb.	Dry bulb.	Wet bulb.	Direction.	Mean Force 1-6.	Direction.	Mean Force 1-6.					3 inches.	12 inches.									
																													inches.	"	inches.	"
1		inches.	"	inches.	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	1st few drops rain, 2nd little rain, 3rd heavy, 4th rain				
2														SE	0.25	var	0.25	0	8	8	56	56	54					3rd rain				
3														SE	9	SE	4.25	0	6	12	57.5	56	54									
4														SE	4	SE	4.25	0	3	13	57.5	56.5	54									
5														SE	2.25	var	2.25	0	4	12	54	56	54									
6														SE	2.25	SE	2.25	1	7	6	53	53.5	54					1st rain				
7														SE	4	SE	4.25	1	9	0	54.5	58	54					3rd rain				
8														SE	2.25	SE	2.25	1	10	0	53.5	53	54					2nd rain				
9														SE	1	SE	0.25	0	9	7	53	58	54									
10														SE	2.25	SE	6.25	0	6	5	56	56	53					1st rain				
11														SE	0.25	SE	0.25	1	8	3	56.5	58.5	53					3rd rain, mist, thunder				
12														SE	0.25	SE	0.25	0	4	12	57	56	53									
13														SE	0.25	SE	0.25	1	8	4	57	56.5	53					1st rain, mist, solar halo				
14														SE	1	SE	0.25	1	10	0	56.5	58.5	53					4th rain, mist				
15														SE	1	SE	0.25	0	10	0	56	57	53					mist				
16														SE	1	SE	2.25	0	4	12	57	57	53									
17														SE	0.25	SE	0.25	0	6	10	56	57	53									
18														SE	0.25	SE	0.25	0	7	6	57	57	53									
19														SE	0.25	SE	0.25	0	8	5	58.5	57	53.5									
20														SE	0.25	var	0.25	0	10	9	59.5	57.5	53.5					mist				
21														SE	0.25	SE	0.25	0	6	7	60	58.5	56					mist				
22														SE	0.25	SE	1	1	8	2	58	58.5	56					1st rain, mist				
23														SE	0.25	SE	0.25	0	3	3	59.5	58.5	56					mist				
24														SE	0.25	SE	2.25	0	2	13	59	58	56									
25														SE	2.25	SE	2.25	0	3	12	58	57	56									
26														SE	0.25	SE	0.25	0	6	7	58.5	58	56									
27														SE	4	SE	9	1	7	8	58	58.5	56					1st rain				
28														SE	4	SE	4	0	4	10	54.5	57	56									
29														SE	0.25	SE	0.25	0	2	13	53.5	56.5	56					aurora				
30														SE	2.25	SE	4	0	4	11	53.5	56	56									
31														SE	1	SE	0.25	0	6	7	54	56	56									
Sums.															46.8		41.59	2.33	197	220	1753.3	1755	1708									
Means.															1.50		1.02		6.3	7.0	56.5	56.6	55.1									
Index Errors.																																
Correc- tion 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					

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

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

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

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

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

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

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

SUMMARY OF THE WINDS.										
Direction.	N	NE	E	SE	S	SW	W	NW	Calm or Variable.	Mean Force.
A.M.	5	5	0	6	0	9	0	6	0	1.50
P.M.	5	3	0	9	1	4	1	4	4	1.02

1.26

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

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

Difference, being Monthly Range,.....

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

Mean Daily Range,.....

Greatest Daily Range,.....

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

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(Signed) Wm. Cruickshank
(Designation) 12 Rose St Aberdeen

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

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

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

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

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

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

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

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

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

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

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

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

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

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

The temperature of springs or deep wells is recommended to be taken whenever practicable, mentioning whether spring or well, and its depth from the surface. **Alexander, James Brown, Remondelle Depression or Elevation of Tides.**—These should be specially noticed, together with the exact hour at which they were first seen, their continuance, and direction. **Building, Leafing, and Flowering of Trees.**—It is necessary to bear in mind that varieties of the same species of tree differ widely in their times of leafing and flowering. *Individual* trees or shrubs of each kind should therefore be chosen (if possible early kinds), and their indications should be alone noted—always the same plant from year to year being noticed.

Ozone.—Mention whether Schönbain's or Moritz's scale and papers are used. They may be had at Messrs. Adie and Son's, 50, Princes Street, and at Mr. Bryson's, 60, Princes Street, Edinburgh. **Electricity.**—14th balls suspended by a silk thread, in connection with a metallic conductor, and under cover, and the degrees of a circle being used to express the degree of repulsion, form a cheap and convenient electrometer. Excited glass or sealing-wax ascertains the nature of the electricity.

OBSERVATIONS IN CONNECTION WITH THE PERIODICAL RETURN OF THE SEASONS.

FOREST TREES.	Flower.	Leaf buds first appear.	In Leaf.	Directed of Leaves.	CROPS mentioning variety.	Seeds or Planting.	MIGRATORY BIRDS.	First Arrival.	Departure.
Barberry,					Rye Grass,		Cuckoo,		
Bourville or Elder,					Barley,		Crow,		
Broom,					Beet or Big,		Curlew,		
Hazel,					Wheat,		Golden Plover,		
Hawthorn,					Peas,		Lapwing,		
Lilac,					Oats,		Swallow,		
Laurum,					Turnips,		Other Birds, naming them—		
Mezereum,					Beans,		Rail,		
Mountain Ash or Rowan,					Whit,		Starling,		
Red Flowering Currant,					Plum,		Swan,		
Rhododendron Ponticum,					Peach,		Gooseberry,		
Willow,					Apple,		Plum,		
					Black Currant,		Strawberry,		
					Cherry,				
					Gean,				
					Gooseberry,				
					Pear,				
					Plum,				
					Strawberry,				

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.

As the signs connected with the periodical return of the seasons are only printed & wanted, it would be more convenient to note these in the above table for the 3 months in the day. Schedule of each quarter. If I do not hear from you, I shall infer that the plan meets with approbation. A.B.

METEOROLOGICAL RETURNS.

EDINBURGH.

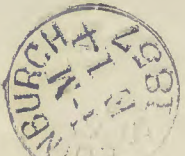
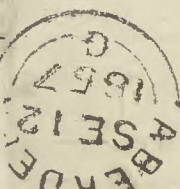
21, Rutland Street,

Sec., Meteorological Society,

DR STARK,

To

See Observations in the Monthly Returns.



SCOTTISH METEOROLOGICAL SOCIETY.

Observations taken at Aberdeen, County of Aberdeen, in Lat. 57° 09', Long. 2° 6' W, Height above Sea 115 feet.

Distance from Sea 1/2 miles. During the MONTH of September 1857.

Days of Week.	Days of Month.	BAROMETER.				SELF-REGISTERING THERMOMETERS.				HYGROMETER.				WIND.				RAIN.		CLOUD. 1-10	SUNSHINE.	THERMOMETERS under Ground.		Temperature of SPRING or WELL.	Temperature of SEA.	OZONE. 0-10	ELECTRICITY.	GENERAL REMARKS. As to occurrence of Thunder, Lightning, Storms, Hail, Meteors, Remarkable Depression or Elevation of Barometer, etc. Mention the hour at which these began and ended.																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																							
		8 ^h A.M.		— ^h P.M.		Max. in Air.	Min. in Air.	Max. Black bulb in Sun.	Min. Black bulb over Grass.	8 ^h A.M.		— ^h P.M.		— ^h A.M.		— ^h P.M.		Days on which it fell.	Amount.			— ^h A.M.																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																													
		Barometer.	Attached Thermometer.	Barometer.	Attached Thermometer.					Dry bulb.	Wet bulb.	Dry bulb.	Wet bulb.	Direction.	Mean Force 1-6.	Direction.	Mean Force 1-6.					3 inches.	12 inches.																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																												
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Barometer, mean corrected reading of Column No. 1 (A.M.),.....= 29.864
 Diameter of tube _____ inch; correction for capillarity to be added,.....+ .005
 Sum,..... 29.864
 Correction for Temperature from Column No. 2 to be deducted,.....= .095
 Sum,..... 29.769
 Correction for Height above Sea-level, _____ feet, to add,.....= 1.33
 Barometer corrected and reduced to 32° and Sea-level,.....= 29.902

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

Barometer, Highest observed reading of Month,.....= 30.340
 Lowest do. do.,.....= 29.238
 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.	2	6	2	1	2	14	1	2	0	
P.M.	*									

Dry bulb Thermometer (mean of Cols. 9 and 11),..... 57.1
 Wet bulb Thermometer (mean of Cols. 10 and 12),..... 54.75
 † Dew-point Temperature,..... 52.5
 † Elastic Force of Vapour,..... .395 inch
 † Weight of Vapour in a Cubic Foot of Air,..... 4.40 gm
 † Additional Weight required to Saturate a Cubic Foot,..... .7 gm
 † Degree of Humidity (Saturation 100),..... 85

Highest Reading Self-Registering Thermometer,..... 69 on the 17th
 Lowest do. do.,..... 40 on the 25th
 Difference, being Monthly Range,..... 29
 Mean of Self-Registering Thermometers,..... 55.4
 Mean Daily Range,..... 12.8
 Greatest Daily Range,..... 2.0

(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 sum

61.8
 29.0
 1110.8
 55.4

INSTRUCTIONS FOR MAKING METEOROLOGICAL OBSERVATIONS.

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

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

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

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

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

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

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

The *minimum* Registering Thermometer, for ascertaining the lowest temperature during the night from radiation, should have its bulb minutely blackened and rendered dull, and be minutely 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 mesh covering it to be often changed. In towns once a month, or oftener, if the weather is dusty, and the mesh gets foul; in the country wherever the mesh seems to be foul. The bulb should be covered with thin tissue or blotting paper below the mesh, and the mesh should always be thoroughly wetted, and freed from starch, before being used; and the cotton wick which conducts moisture to it should be previously soaked in a solution of washing soda, and then in pure water, before being attached, in order that

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

Sunshine.—The amount of sunshine may be represented by figures in the fractional form, of which the denominator indicates the number of hours from sunrise to sunset, and the numerator the number of hours the sun shines. Thus, if the sun rose at 5 and set at 6, and during that period shone for 3 hours, it would be registered as $\frac{3}{12}$.

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

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

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

Meteors. *Aurora Borealis.* *Remarkable Depressions or Elevations of Barometer.* *Remarkable Falls of Rain.* *Hail or Snow.* *Thunder and Lightning,* etc., should be specially noticed, together with the exact hour at which they were first seen, their continuance, and direction. *Birding.* *Fishing,* and *Flooding of Tides.* It is necessary to bear in mind that the varieties of the same species of trees differ widely in their times of budding and flowering. *Individual trees or shrubs of each kind* should therefore be chosen (if possible early fruits), and their indications should be noted—always the same plant from year to year being noted.

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

OBSERVATIONS IN CONNECTION WITH THE PERIODICAL RETURN OF THE SEASONS.

FOREST TREES.	Flower.	Leaf buds first appear.	In Leaf.	Directed of Leaves.	CROPS mentioning variety.	Sowing or Planting.	Appearing above Ground.	In Ear or Flower.	First Cut or Raisin.
Alder.....					Barley.....				
Ash.....					Beet or Big.....				
Beech.....					Oats.....				
Birch.....					Wheat.....				
Elm.....					Beans.....				
Larch.....					Pease.....				
Lime.....					Potatoes.....				
Oak.....					Turnips.....				
Sycamore or Plane.....					Rye Grass.....				

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

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

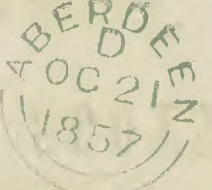
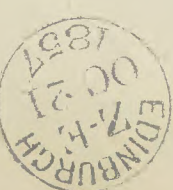
METEOROLOGICAL RETURNS.

EDINBURGH

21, Rutland Street,

Sec., Meteorological Society,

DR STARR,



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.

it may be inorganically wetted, as 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 mesh, the evaporation from the ice going on from the supply wetted bulb.

John Grogan,—as “Fleming’s Rain Gauge,” seem to possess several advantages over others; the Society gives the preference to them; but whatever form be employed, in order that all the

the simply wetted bulb.

stations may be comparable, so still, it is recommended that the receiver be sunk in the ground, so that the top of the receiver is nearly on a level with the top blades of close cut grass, in a place as distant as possible from trees, hedges, high walls, and irregular or broken ground. When more than one Ganze is kept, they should be placed near each other, but at different heights about the ground, and their indications noted in the *general remarks*, mentioning their height above ground—the regular column in

The Chinese being versed in the geomantic art, are apt to give *Pin-fa*—Isolated wind-arcs or weather-coats are more frequent indications of the general direction of the wind, in consequence of the currents of air at the surface of the ground being so much influenced by the neighbourhood of hills, valleys, buildings, &c. Where few 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. The motion of the higher strata of clouds gives no such indication. Finding the clouds, the general motion of the smoke

of a hamlet village, or of a tall chimney, gives a better indication of the general direction of the wind than any wind-vane. The observer should, however, be careful to ascertain the direction by the compass, and to state whether he has ascertained the direction by the compass or otherwise. It is generally agreed to reckon the force of the wind from 0 to 6; the latter being the severest hurricane in this island. *Clouds*.—The Society recommends observers to adopt the Howard nomenclature of clouds. The scale of cloud in the visible sky is reckoned from 0 to 10. Thus, a sky quite free

from cloud is U_1 , a sky half covered with cloud is 0.5; and the whole sky is covered with cloud is 1.0. Clouds often cover the sky in a patchy way, and the patchiness is described in terms of even more of the visible sky without cloud than with cloud. For example, a sky with 10% cloud is described as 0.1, and a sky with 20% cloud is described as 0.2. The patchiness of clouds would not necessarily express, or agree with, the common notion of patchiness. For example, a sky with 10% cloud is thought by some ornithological astronomers to have a powerful effect in disrupting clouds; it would be well to note in the general observations any facts bearing on this point, for a few days (or months, as the case may be) before and after every full moon, and the same observations ought to be made at the periods of new moon.

Sunshine—The amount of sunshine may be represented by figures in the horizontal row, of which the *dimmometer* indicates the number of hours from sunrise to sunset. Thus, if the sun rose at 6, and set at 6, and during that period shone for 3 hours, it would be registered as 3p.

Dimmometer's value *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 thermometer readings at 3 inches and 6 inches below the surface of the ground, to ascertain the temperature of what may be termed the agricultural soil.

Temperature of the Sea.—As the meteorology of the island is highly incomplete without a knowledge of the mean temperature of the ocean which surrounds it, the Society strongly recommends that the temperature of the sea at a depth of 6 feet or 1 fathom from the out of all piers or rocks round the coast, where free from the influence of river waters, and as near as may be about the time of high water. A thermometer, with its bulb fixed in a small tin pail, covered with a sopping rag, and with a weight attached, is sunk to the required depth, and in ten minutes drawn up and read. Convenient and cheap instruments are furnished by Messrs Adair and Son, and Mr Bryson, Edinburgh.

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

Meteors, Aurora Borealis, Remarkable Depression or Elevation of Barometer, Remarkable Falls of Rain, Hail or Snow, Thunder and Lightning, etc., should be specially noticed, together with the exact

about as which they were first seen, their contrasting, and uncontrasted, and their indications should be alone noted—always the same

of a circle being used to express the degree of repulsion, form a cheap and convenient electrometer. Extended glass or sealing-wax ascertains the nature of the electricity.

1892

Y., C. & G. Great

Potatoes,	
Turnips,	
Rye Grass,	

leaf.	Divested of Leaves.	CROPS, mentioning variety.
-------	------------------------	-------------------------------

FOREST TREES.	Flower.	Leaf Blk. first appears.	In Leaf.	Directed of Leaves.	CROPS, meadowing valley.	Sowing or Planting.	Aperting above Ground.	First Cut
Alder,.....					Barley.....		10th July.	17 Aug.
Ash,.....					Beer or Big,.....		10th July.	16 Aug.
Beech.....					Oats.....		14th July.	15 Aug.
Birch.....					Wheat.....		3rd July.	25 Aug.
Elm.....					Beans.....		18th July.	
Larch.....					Pease.....			
Lime.....					Potatoes.....		7th July.	
Oak.....					Turnips.....			
Sycamore or Plane.....					Rye Grass.....		17th July.	28th June

SHRUBS ETC.	First in Blossom.	FRUITS.	Early Blooming.	Fruit ripe generally.	MIGRATORY BIRDS.	First Arrival.	Departure.
Barberry.....		Apple, crop, rather poor		August	Cuckoo,.....		end Aug.
Bourtree or Elder,.....	beginning of July	Black Currant, crop very poor and dry		end July	Curlew,.....		
Broom.....		Cherry, crop very poor		end July	House-Swallow.....		
Hazel.....		Gean, crop good		middle of Aug.	Lapwing.....		
Hawthorn.....		Gooseberry, crop very good		end of Aug.	Plover,.....		
Holly.....		Peach.....		end of Aug.	Sand Martin.....		
Laburnum.....		Pear, crop good		end of Aug.	Starling.....		
Lilac.....		Plum.....			Swan.....		
Mezerion.....		Strawberry, crop very good		all July & Aug.	Rail.....		
Mountain Ash or Rowan.....					Other Birds, naming them.....		beginning
Red Flowering Currant.....							
Rhododendron Ponticum.....							
Wilm.....							

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.

green crops, grain an average in quantity but straw a rather deficient
Potatoes small $\frac{1}{2}$ to $\frac{3}{4}$ diseased in many places
Swamps reared much drowned in latter part of Aug & beginning of
Sept, again in latter part of Sept & beginning of Oct. ~~Fungus & other~~ have
& mildew have appeared to some extent among them
Buck of grain crops now in the neck of ~~the~~ raised bend of Fox

METEOROLOGICAL RETURNS.

TARK, Sec., Me

21, Rutland Street,

EDINBURGH.

ABLRD
185

A circular library stamp from the Edinburgh Public Museum. The text "EDINBURGH" is curved along the top inner edge, "P-M" is in the center, and "H.C." is curved along the bottom inner edge. The date "OCT 12 1867" is stamped across the middle.

95

SCOTTISH METEOROLOGICAL SOCIETY.

Observations taken at Aberdeen, County of Aberdeen, in Lat. 57° 9' N., Long. 2° 6' W., Height above Sea 115 feet. *the mean level of.*
 Distance from Sea 1 1/2 miles. During the MONTH of October 1857.

Days of Week.	Days of Month.	BAROMETER.				SELF-REGISTERING THERMOMETERS.				HYGROMETER.				WIND.				RAIN.		CLOUD. 1-10.	SUNSHINE.	THERMOMETERS under Ground.		Temperature of SPRING or WELL.	Temperature of SEA.	OZONE. 0-10.	ELECTRICITY.	GENERAL REMARKS. As to occurrence of Thunder, Lightning, Storms, Hail, Meteors, Remarkable Depression or Elevation of Barometer, etc. Mention the hour at which these began and ended.
		2 1/2 h. A.M.		h. P.M.		Max. in Air.	Min. in Air.	Max. Black bulb in Sun.	Min. Black bulb over Grass.	2 1/2 h. A.M.		h. P.M.		h. A.M.		h. P.M.		Days on which it fell.	Amount.			h. A.M.						
		Barometer.	Attach- ed Ther- mometer	Barometer.	Attach- ed Ther- mometer					Dry bulb.	Wet bulb.	Dry bulb.	Wet bulb.	Direction.	Mean Force 1-6.	Direction.	Mean Force 1-6.					3 inches.	12 inches.					
	1	29.912	60			58	49			57	55.5								.01									
	2	29.876	62			64	44			52.5	49								.01									
	3	29.726	62			60	43			53	46																	
	4	29.672	61			55	37			48	43																	
	5					53	37			46.5	43																	
	6	29.408	55			52	34			43.5	43																	
	7	29.526	58			53.5	31			43	42																	
	8	29.200	60			53	40			52	50.5								.06									
	9	29.200	60			53.5	48			52.5	51.5								.20									
	10	29.610	59			54	40			48	47								.22									
	11	29.712	56			55	42			51	49.5								.01									
	12	29.972	57			62	41			48.5	47																	
	13	30.120	61			59	45			54	51																	
	14	30.084	61			58	48			56	55																	
	15	30.050	61			60	47			55	54																	
	16	30.130	62			60	48			53	51.5								.04									
	17	29.838	60			57	49			54.5	53.5																	
	18	29.634	62			57	50			55	53								.11									
	19	29.760	60			57	47			52.5	51.5																	
	20	29.900	57			56	35			46	45																	
	21	29.686	60			54	42			47	46																	
	22	29.818	54			52	28			40	38.5																	
	23	30.200	51			50	37			43.5	41.5																	
	24	30.390	50			47	34			45	44								.07									
	25	30.250	55			53	51			52	50								.01									
	26	29.950	55			53	41			52.5	50.5																	
	27	29.850	57			53	48			52.5	52								.19									
	28	29.860	58			54	49			54	53								.07									
	29	29.700	55			56	41			46.5	45.5																	
	30	29.492	54			53	35			44	42																	
	31	29.860	56			49	35			45	42								.04									
	Sums.	894.370	1739			1711	1296			1543.5	1486.5							13	1.04									
	Means.	29.812	57.96			55.19	41.80			49.80	47.95							Rain										
	* Index Errors.	- .018																										
	Correc- tion for Diurnal Range.†																											
	Corrected Means.	29.794	57.96			55.19	41.80			49.80	47.95																	
	No. of Column.	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	

Barometer, mean corrected reading of Column No. 1 (A.M.),.....= 29.794 Column No. 3 (P.M.),.....= 29.814
 Diameter of tube .49 inch; correction for capillarity to be added,.....+ .179 Capillarity,.....= + .179
 Sum,..... 29.794 Sum,.....
 Correction for Temperature from Column No. 2 to be deducted,.....= - .179 Temp. from Col. 4,.....= - .179
 Sum,..... 29.715 Sum,.....
 Correction for Height above Sea-level,.....feet, to add,.....= + 1.33 Height,.....= + 1.33
 Barometer corrected and reduced to 32° and Sea-level,.....29.848 At 32° and Sea-level,.....= 29.848

SUMMARY OF THE WINDS.											
Direction.	N	NE	E	SE	S	SW	W	NW	Calm or Variable.	Mean Force.	
A.M.	<u>1</u>	<u>1</u>	<u>4</u>	<u>2</u>	<u>14</u>	<u>6</u>	<u>2</u>	<u>0</u>			
P.M.											

Dry bulb Thermometer (mean of Cols. 9 and 11),*.....49.80 Highest Reading Self-Registering Thermometer,.....64 on the 23
 Wet bulb Thermometer (mean of Cols. 10 and 12),*.....47.95 Lowest do. do.,.....28 on the 22
 † Dew-point Temperature,.....45.8 Difference, being Monthly Range,.....36
 † Elastic Force of Vapour,......310 in. Mean of Self-Registering Thermometers,.....48.44
 † Weight of Vapour in a Cubic Foot of Air,.....3.59 grs. Mean Daily Range,.....13.39
 † Additional Weight required to Saturate a Cubic Foot,......6 grs. Greatest Daily Range,.....22.5
 † Degree of Humidity (Saturation 100),.....87

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

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

correction of Index error and capillarity in one sum

55.1
41.8
13.3
41.8

(Signed) Thomas David Gray
 (Designation) Student

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.

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

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

The corrections necessary to be applied to the barometric readings depend on the form of the instrument. The mode of making these corrections, and the tables employed for the purpose, will be found in the 4th Report of the Committee of the Royal Society on Physics and Meteorology, 1849, price 1s. The daily readings of the barometer ought to be entered on the Schedule as read off, and the corrections only applied to the mean for the month. **Self-Registering Thermometers and Hygrometers.**—These should be placed alongside of each other, in a place freely exposed to the air, but protected from sunning, and from reflected heat, as well as from radiation and from rain, and as near as may be four feet from the general surface of the ground. Different contrivances are used for this purpose, either a double ventilated box with louver-boarded sides, fixed at a north window, and projecting 12 inches from the wall, so as to allow a free current of air to pass between the box and the wall; or in a double meat-safe ventilated box with louver-boarded sides, fixed in an exposed place, and if possible over grass. Whatever means are finally decided on, the position of the instruments should be mentioned, and should not be changed (without due notice being given to the Secretary), in order that the results of one month's observations may be strictly comparable with those of another.

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

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

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

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

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

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

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

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

Sunshine.—The amount of sunshine may be represented by figures in the fractional form, of which the denominator indicates the number of hours from sunrise to sunset, and the numerator the number of hours the sun shines. Thus, if the sun rose at 6 and set at 6, and during that period shone for 3 hours, it would be registered as $\frac{3}{12}$. **Thermometers under Ground.**—Though the temperature and hygrometric conditions of the air are those which chiefly influence the growth of crops, it is important for the health of the crops, and for the germination of the seed, that the soil itself should have a certain temperature. To collect facts which may illustrate this, it is recommended to have thermometers sunk 3 inches and 12 inches below the surface of the ground, to ascertain the temperature of what may be termed the agricultural soil.

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

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

Meteors. *Aurora Borealis, Remarkable Depression or Elevation of Barometer, Remarkable Falls of Rain, Hail or Snow, Thunder and Lightning, etc.*, should be specially noticed, together with the exact hour at which they were first seen, their continuance, and direction. **Budding, Leafing, and Flowering of Trees.**—It is necessary to bear in mind that varieties of the same species of tree differ widely in their times of budding and flowering. Individual trees or shrubs of each kind should therefore be chosen (if possible early kinds), and their indications should be alone noted—always the same plant from year to year being noticed.

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

OBSERVATIONS IN CONNECTION WITH THE PERIODICAL RETURN OF THE SEASONS.

FOREST TREES.	Flower.	Leaf Buds first appear.	In Leaf.	Divested of Leaves.	CROPS, medicinal variety.	Sorting or Planting.	Appearing above Ground.	In Ear or Flower.	First Cut or Raised.
Alder.....					Barley.....				
Ash.....					Beer or Big.....				
Beech.....					Oats.....				
Birch.....					Wheat.....				
Elm.....					Beans.....				
Larch.....					Peas.....				
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.....		Apples.....			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.....		
Mezereum.....		Strawberry.....			Rail.....		
Mountain Ash or Rowan.....					Other Birds, naming them—		
Red Flowering Currant.....							
Rhododendron Ponticum.....							
Whin.....							

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

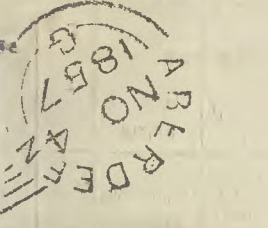
METEOROLOGICAL RETURNS.

DR STARK,

Sec., Meteorological Society,

21, Rutland Street,

EDINBURGH.



SCOTTISH METEOROLOGICAL SOCIETY.

Observations taken at Aberdeen, County of Aberdeen, in Lat. 57° 9', Long. 2° 7' W, Height above Sea 90 feet.

Distance from Sea 2 miles.

During the MONTH of October 1857.

Days of Week.	Days of Month.	BAROMETER.				SELF-REGISTERING THERMOMETERS.				HYGROMETER.				WIND.				RAIN.		CLOUD.	SUNSHINE.	THERMOMETERS under Ground.		Temperature of SPRING or WELL.	Temperature of SEA.	OZONE.	ELECTRICITY.	GENERAL REMARKS. As to occurrence of Thunder, Lightning, Storms, Hail, Meteors, Remarkable Depression or Elevation of Barometer, etc. Mention the hour at which these began and ended.	
		h. A.M.		h. P.M.		Max. in Air.	Min. in Air.	Max. Black bulb in Sun.	Min. Black bulb over Grass.	h. A.M.		h. P.M.		h. A.M.		h. P.M.		Days on which it fell.	Amount.			h. A.M.							
		Barometer.	Attach- ed Ther- mometer	Barometer.	Attach- ed Ther- mometer					Dry bulb.	Wet bulb.	Dry bulb.	Wet bulb.	Direction.	Mean Force 1-6.	Direction.	Mean Force 1-6.					9	12						
																													inches.
																													1 a few drops rain hail & 2 a little rain 3 showers. 4 rainy
	3																												3 rain
	4																												
	5																												
	6																												
	7																												
	8																												2 rain
	9																												3 rain
	10																												3 rain
	11																												1 rain
	12																												2 rain
	13																												2 rain. solar halo
	14																												2 rain
	15																												2 -
	16																												3 -
	17																												3 -
	18																												
	19																												
	20																												
	21																												mostly
	22																												
	23																												3 rain, 2 hail, aurora
	24																												3 -
	25																												
	26																												
	27																												3 rain
	28																												3 -
	29																												
	30																												2 rain
	31																												
	Sums.																												
	Means.																												
	Index Errors.																												
	Correc- tion 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		

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

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

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

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

Sum,.....:..... Sum,.....:.....

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

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

SUMMARY OF THE WINDS.										
Direction.	N	NE	E	SE	S	SW	W	NW	Calm or Variable.	Mean Force.
A.M.	0	1	0	3	3	14	5	2	3	0.90
P.M.	1	1	0	6	3	14	3	1	2	1.27

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

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

Difference, being Monthly Range,.....

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

Mean Daily Range,.....

Greatest Daily Range,.....

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

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

‡ The Diurnal Range for Scotland is as yet unknown.

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

(Signed) Alex^r Cruckshank

(Designation) 12 Rose St Aberdeen

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 drawn into the stem by reversing the instrument, and tapping it gently with the hand. If it cannot be thus expelled, the instrument is useless and repaired.

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

Meteors. *Aurora Borealis, 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.

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

OBSERVATIONS IN CONNECTION WITH THE PERIODICAL RETURN OF THE SEASONS.

FOREST TREES.	Flower.	Leaf buds first appear.	In Leaf.	Divested of Leaves.	CROPS, mentioning variety.	Spring or Planting.	Arriving above Ground.	In Ear or Flower.	First Out or Raised.
Alder.....					Barley.....				
Ash.....					Beer or Bigg.....				
Beech.....					Oats.....				
Birch.....					Peas.....				
Elm.....					Potatoes.....				
Larch.....					Pumpkins.....				
Line.....					Turnips.....				
Oak.....					Wheat.....				
Sycamore or Plane.....					Yarn.....				

SHRUBS, ETC.	First in Blossom.	FRUITS	First in Blossom.	First ripe generally.	MIGRATORY BIRDS.	First Arrival.	Departure.
Barberry.....		Apples.....			Cuckoo.....		
Bourtree or Elder.....		Black Currant.....			Crow.....		
Broom.....		Cherry.....			House-Swallow.....		
Hazel.....		Corn.....			Lapwing.....		
Hawthorn.....		Corn.....			Plover.....		
Holly.....		Gooseberry.....			Sand-Martin.....		
Laburnum.....		Peach.....			Swan.....		
Lilac.....		Plum.....			Starling.....		
Measeon.....		Strawberry.....			Other Birds, naming them.....		
Mountain Ash or Rowan.....					Rail.....		
Red Flowering Currant.....					Other Birds, naming them.....		
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 prevalent among Cattle; and the Agricultural condition of the district generally.

METEOROLOGICAL RETURNS.

EDINBURGH.

21, Rutland Street,

Sec., Meteorological Society,

DR STARK,

To



SCOTTISH METEOROLOGICAL SOCIETY.

Observations taken at Aberdeen, County of Aberdeen, in Lat. 57° 9' N, Long. 2° 6' W, Height above Sea 115 feet. *the mean level of*
Distance from Sea 1/2 miles. During the MONTH of November 1857.

Days of Week.	Days of Month.	BAROMETER.				SELF-REGISTERING THERMOMETERS.				HYGROMETER.				WIND.				RAIN.		CLOUD.	SUNSHINE.	THERMOMETERS under Ground.		TEMPERATURE of SPRING & WELL.	TEMPERATURE of SEA.	OZONE.	ELECTRICITY.	GENERAL REMARKS, As to occurrence of Thunder, Lightning, Storms, Hail, Meteors, Remarkable Depression or Elevation of Barometer, etc. <i>Mention the hour at which these began and ended.</i>	
		8 ¹ / ₂ h. A.M.		h. P.M.		Max. in Air.	Min. in Air.	Max. Black bulb in Sun.	Min. Black bulb over Grass.	8 ¹ / ₂ h. A.M.		h. P.M.		h. A.M.		h. P.M.		Days on which it fell.	Amount.			h. A.M.							
		Barometer.	Attach- ed Ther- mometer	Barometer.	Attach- ed Ther- mometer					Dry bulb.	Wet bulb.	Dry bulb.	Wet bulb.	Direction.	Mean Force 1-6.	Direction.	Mean Force 1-6.					3 inches.	12 inches.						
																													Inches.
1		29.650	55			54	41.5			53	51																		
2		29.550	54			56	46			50.5	48.5							.01											
3		29.750	54			53	36			42	41.5							1.06											
4		30.060	49			46	34			41.5	40.5																		
5		29.880	50			48	38			43.5	43							.23											
6		29.890	52			49	40			47.5	47							.08											
7		30.144	50			50	32			38.5	37.5							.01											
8		30.210	51			47	34			46.5	46																		
9		30.386	54			49	43			48	47																		
10		30.640	54			50	43			48.5	48							.22											
11		30.750	53			49	43			47.5	45.5							.01											
12		30.680	50			50	35			43	41.5																		
13		30.450	51			48	36			47	46							.01											
14		30.470	57			53	43			51.3	50.5																		
15		30.460	57			53	46			49	48																		
16		30.458	55			50	42			48	47							.02											
17		30.350	52			50	44			49.5	47.5							.10											
18		30.380	53			51	45			51	48.5							.05											
19		30.282	53			51	45			49.5	47.5							.01											
20		29.994	53			50	43			49.5	48																		
21		30.088	53			53	37			43	41.5																		
22		29.824	53			49	39			47	46							.06											
23		29.120	53			52	43			49.5	49							.31											
24		29.290	44			50	29	21		34.5	32							1.28											
25		29.572	42			37.5	28			37	35.5							.27											
26		29.584	43			39	26			37.5	37							.18											
27		30.200	44			44	29			34.5	34																		
28		30.114	43			38	25			31																			
29		30.122	42			37	25			31	30.5																		
30		30.054	45			43	27			43	42							.10											
31																													
Sums.		902.360	1519			1689.5	1117.5			1352.3	1267.5							184.01											
Means.		29.435	50.6			49.6	37.2			44.4	42.2							5.94											
Index Errors.		-.018																											
Correc- tion 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		

Barometer, mean corrected reading of Column No. 1 (A.M.),.....= 30.045 Column No. 3 (P.M.),.....= 30.435 Barometer, Highest observed reading of Month,.....= 30.750 on 11th
Diameter of tube.....inch; correction for capillarity to be added,.....+ -.018 Capillarity,.....= + -.018 Lowest do. do.,.....= 29.130 on 23rd
Sum,.....= 30.027 Sum,.....= 30.395 Difference, or Monthly Range,.....= 1.620
Correction for Temperature from Column No. 2 to be deducted,.....= -.058 Temp. from Col. 4,.....= -.058
Sum,.....= 29.969 Sum,.....= 30.002
Correction for Height above Sea-level,.....feet, to add,.....= + 1.32 Height,.....= + 30.135
Barometer corrected and reduced to 32° and Sea-level,.....= 30.135 At 32° and Sea-level,.....= 30.135

SUMMARY OF THE WINDS.												Calm or Variable.	Mean Force.
Direction.	N	NE	E	SE	S	SW	W	NW					
A.M.													
P.M.													
Highest Reading Self-Registering Thermometer,.....= <u>56</u> on the <u>2nd</u>													
Lowest do. do.,.....= <u>25</u> on the <u>28th & 29th</u>													
Difference, being Monthly Range,.....= <u>31°</u>													
Mean of Self-Registering Thermometers,.....= <u>43.4</u>													
Mean Daily Range,.....= <u>12.4</u>													
Greatest Daily Range,.....= <u>21. on 24th</u>													

(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 deducted. 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
$$\begin{array}{r} 49.6 \\ 37.2 \\ \hline 86.8 \\ 186.8 \\ \hline 124 \end{array}$$

SCOTTISH METEOROLOGICAL SOCIETY.

Observations taken at Aberdeen, County of Aberdeen, in Lat. 57° 9' N, Long. 2° 5' W, Height above Sea 90 feet.

Distance from Sea 2 miles. During the MONTH of January 1857.

Days of Week.	Days of Month.	BAROMETER.		SELF-REGISTERING THERMOMETERS.				HYGROMETER.				WIND.				RAIN.		CLOUD.	SUNSHINE.	THERMOMETERS under Ground.		TEMPERATURE of SPRING or WELL.	TEMPERATURE of SEA.	OZONE.	ELECTRICITY.	GENERAL REMARKS. As to occurrence of Thunder, Lightning, Storms, Hail, Meteors, Remarkable Depression or Elevation of Barometer, etc. Mention the hour at which these began and ended.		
		h. A.M.		h. P.M.		Max. in Air.	Min. in Air.	Max. Black bulb in Sun.	Min. Black bulb over Grass.	h. A.M.		h. P.M.		h. A.M.		h. P.M.				Days on which it fell.	Amount.						3 inches.	12 inches.
		Barometer.	Attach- ed Ther- mometer	Barometer.	Attach- ed Ther- mometer					Direction.	Mean Force 1-6.	Direction.	Mean Force 1-6.	3 inches.	12 inches.													
																inches.	"											
1																	3	45	48	51.5				1st few drops, rain, snow, sleet, hail, 2nd a little rain, 3rd showers of rain, 4th rain				
2																	8	45.5	48.5	51.5				2nd rain				
3																	7	46	48	51.5				3rd rain				
4																	9	43.5	46	51				3rd rain				
5																	8	44	46.5	51				3rd rain				
6																	8	45	46	51				2nd rain				
7																	7	43.5	46	51								
8																	9	44	46	51								
9																	8	45	46	51				3rd rain, aurora				
10																	10	45	46	51				2nd rain, aurora				
11																	8	46	47	50.5				2nd rain				
12																	5	46	46.5	50.5				aurora				
13																	8	44	46	50				2nd rain				
14																	9	47	46.5	50								
15																	9	47	46	50				2nd rain				
16																	10	47	47	50				3rd rain				
17																	9	47	47.5	50				3rd rain				
18																	8	45.5	47	50								
19																	8	45.5	47	50								
20																	8	45.5	47	50								
21																	10	45	46.5	50				3rd rain				
22																	7	40	44	49.5				4th rain, 2nd sleet				
23																	7	38	42	49.5				3rd snow, aurora				
24																	4	39	42	49.5				3rd rain, 3rd sleet, lunar halo				
25																	4	38	42	49.5				3rd rain, 3rd hail				
26																	3	36	40	49.5								
27																	10	36	40	49				2nd rain				
28																												
29																												
30																												
31																												
Sums.																	227	50	1318.5	1509								
Means.																	7.5	1.6	43.9	45.4	50.1							
Index Errors.																												
Correc- tion 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	

Barometer, mean corrected reading of Column No. 1 (A.M.),.....=..... Column No. 3 (P.M.),.....=..... Barometer, Highest observed reading of Month,.....=.....
Diameter of tube.....inch; correction for capillarity to be added,.....+..... Capillarity,.....=+..... Lowest do. do.,.....=.....
Sum,..... Sum,..... Difference, or Monthly Range,.....=.....
Correction for Temperature from Column No. 2 to be deducted,.....=..... Temp. from Col. 4,.....=.....
Sum,..... Sum,.....
Correction for Height above Sea-level,.....feet, to add,.....=+..... Height,.....=+.....
Barometer corrected and reduced to 32° and Sea-level,.....=..... At 32° and Sea-level,.....=.....

SUMMARY OF THE WINDS.											
Direction.	N	NE	E	SE	S	SW	W	NW	Calm or Variable.	Mean Force.	
A.M.	0	3	0	2	2	13	1	7	3	1.26	
P.M.	2	3	1	2	2	8	5	4	2	1.28	

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,.....on the.....
Lowest do. do.,.....on the.....
Difference, being Monthly Range,.....
Mean of Self-Registering Thermometers,.....
Mean Daily Range,.....
Greatest Daily Range,.....

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

(Signed) Alex^r Cruickshank
(Designation) 12 Rose St. Aberdeen

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. Aitke 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. A mode of making these corrections, and the tables employed for the purpose, will be found in the "Report of the Committee of the Royal Society on Physics and Meteorology," 1849, price 1s. The daily readings of the Barometer ought to be entered on the Schedule as read off. The corrections only, applied to the mean for the month.

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

The *Self-registering Thermometers* should be placed exactly horizontal. In the case of the ordinary *maximum* thermometer, with clay glass, or steel index, the bulb may be very slightly elevated, in order that the mercurial column may be somewhat aided by the force of gravity in pushing forward the float or index; and in the case of the *minimum* thermometer, the bulb must be slightly depressed, to prevent a draining of the spirit to the top of the tube, and also that any part raised in vapour may return to the column. These thermometers, if read once a-day, should always be read on the 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 directed and the surface rendered dull, and it should be mounted in a blackened box, whose sides should be so high as to protect the bulb from wind. It should be so placed that the sun's rays have free access to it during the heat of the day.

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

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

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

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

Winds.—Isolated wind-vanes or weather-cocks are apt to give false indications of the general direction of the wind, in consequence of the currents of air at the surface of the ground being so much influenced by the neighbourhood of hills, valleys, buildings, etc. Where low clouds are seen drifting along, their direction in reference to known objects, or as noted by means of a mirror fixed over the centre of a pocket compass, will, in general, give the true direction of the current of air near the earth's surface. The notion of the higher strata of clouds gives no such indication. Failing the clouds, the general direction of the smoke of a hearth or village, or of a tall chimney, gives a better indication of the general direction of the wind than any wind-vane. The observations of the clouds, however, are not to be neglected, and are to be recorded as observed, in the general remarks, mentioning their height above 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.

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

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

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

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

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

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

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

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

OBSERVATIONS IN CONNECTION WITH THE PERIODICAL RETURN OF THE SEASONS.

FOREST TREES.	Flower.	Leaf buds first appear.	In Leaf.	Dyed of Leaves.	CROPS, mentioning variety.	Sowing or Planting.	Appearance above Ground.	In Ear or Flower.	First Cut or Raised.
Alder.....					Barley.....				
Ash.....					Beet or Beet.....				
Beech.....					Oats.....				
Birch.....					Peas.....				
Elm.....					Wheat.....				
Larch.....					Boats.....				
Lime.....					Potatoes.....				
Oak.....					Turnips.....				
Sycamore or Plane.....					Rye Grass.....				

SHRUBS, ETC.	First in Blossom.	FRUITS.	First in Blossom.	First in Blossom.	First in Blossom.	First in Blossom.	First in Blossom.	First in Blossom.	First in Blossom.
Barberry.....		Apple.....							
Bourtree or Elder.....		Black Currant.....							
Broom.....		Cherry.....							
Hazel.....		Crab.....							
Hawthorn.....		Gooseberry.....							
Holly.....		Juniper.....							
Laburnum.....		Peach.....							
Lilac.....		Pear.....							
Mountain Ash or Rowan.....		Plum.....							
Red Flowering Currant.....		Strawberry.....							
Rhododendron Ponticum.....									
Whin.....									

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

Have the gardeners 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.

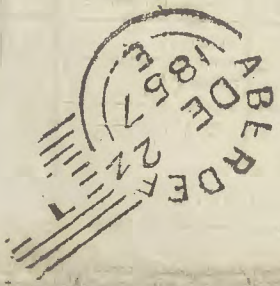
EDINBURGH.

21, Rutland Street,

Sec., Meteorological Society,

WILLIAM STARK,

To



DR STAFF,

See Meteorological Society.

21, Rutland Street.

EDINBURGH.

METEOROLOGICAL RETURNS.

SHRUBS, ETC.	Barberry, Bouree or Elder, Broom, Hazel, Hawthorn, Holly, Laburnum, Lilac, Mountain Ash or Rowan, Red Flowering Currant, Rhododendron Ponticum, Whin,	Apple, Black Currant, Cherry, Gean, Gooseberry, Pear, Plum, Strawberry,	FRUITS.	First in Blossom.	Fruit ripe generally.	MIGRATORY BIRDS.	Cuckoo, Chiffchaff, House-Swallow, Lapwing, Plover, Sand-Martin, Starling, Swan, Rail or Corn Crane, Other Birds, naming them—	First Arrival.	Departure.
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OBSERVATIONS IN CONNECTION WITH THE PERIODICAL RETURN OF THE SEASONS.

[illegible]

INSTRUCTIONS FOR MAKING METEOROLOGICAL OBSERVATIONS

Hour Observation.—Adjustments 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.

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

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

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

be placed against a pigstye of each other, in a place freely exposed to the air, but protected from sunning, and from reflected heat, as far as possible, from the ground, and from rain, and its heat may be *now* *felt* from the eastern surface of the ground. Different contrivances are used for this purpose, either a double ventilated box with leaver-banded sides, fixed at a north windy, and projected 12 inches from the wall, so as to allow a free current of air to pass between the box and the wall, or in a double near-side ventilated box with leaver-banded 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-igniting Thermometer* 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 attracted by the force of gravity in pushing forward the float or index. In the case of the *minimum Thermometer*, the bulb must be slightly depressed, to prevent a draining of the spirit to the top of the tube, and also that any part raised in vapour may return to the column. These Thermometers, if read once a-day, should *always be read on the evening*, so that the temperatures marked on the hours 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* of the spirit.

the material, registering thermometer, or 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 placed. 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.

[illegible]

must be poured over the wet bulb, so as to form a thin film of ice on the muslin, the evaporation from the ice going on as from the simply wetted bulb.

rain gauge—as a Planners' Rain Gauge seems to possess many advantages over others, the Society gives the preference to it. The gauge is made of iron plates, and is so constructed that sections may be tied completely together, so that the Planners' Gauge be used in the ground, so that the top of the reservoir 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 broken ground, and the quantity of Rain Gauge, if possible, be registered daily. When more than one Rain Gauge is kept, they are to be placed near each other, but at different heights above the ground, and their indications noted in the *general remarks*, mentioning their height above ground—the regular column in the Schedule being reserved for the ground Rain Gauge alone.

Pindus—collected Wind-van or Weather-cocks are apt to give false indications of the general direction of the wind, in consequence of the currents of air at the surface of the ground being so much influenced by the neighbourhood of Hills, valleys, buildings, &c. Where low clouds are seen drifting along their direction in reference to known objects, or as noted by means of a mirror on which a compass may be laid, or by means of a circular mirror fixed over the centre of a pocket compass, with, in general, 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 part of a cloud gives no such indication. Feeling the clouds, the

the general direction of the smoke of a hammer or winage, or of a tall chimney, gives a better indication of the general direction of the wind than any wind-vane. The observer should state whether he has ascertained the direction by reflection or otherwise. For mode of estimating the force of the wind, see "Directions for Reading Instruments;" but in all cases it is better to make use of Lind's Anemometer, as pointed 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 clouds enough, so that the indications noted in the column for clouds would not necessarily express, or agree with, the column for visibility.

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

Thermophilous mides. *Growing*.—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 *Thermophilous* snail 35, 12, and 22 burrow beneath the surface of the ground, to ascertain the temperatures of what may be termed the agricultural soil; and the observer should enter in the Schedule the *kind* of soil; and the observer should indicate, and whether naturally wet or dry.

temperature of the Sea.—As the meteorology of the strand is incomplete without a knowledge of the mean temperature of the Ocean which surrounds it, the Society strongly recommends the temperature of the Sea at a depth of 6 feet or 1 fathom 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 mean of high water. A thermometry, with its bulb fixed in a small pitcher, covered with a sloping lid, and with a weight attached,

sent to the returned depths, and in kinnamits drawn up and sealed. The instruments are furnished by Messrs Aida 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.

Diets.—*Amayori* *Demari*, *Removable Depressant or Dietsent* *Demari*, *Removable Pills of Itam, Hail or Snow, Thawing* *Demari*, *Yukihaku*, etc., should be specially noticed, together with the date and hour at which they were first used, their continuance, and their effects.

Food and Clothing of the Nurse.—It is necessary to

tion in mind that varieties of the same species of tree differ widely in their times of coming and of flowering. *Michelia* trees or shrubs, each kind distinct heretofore be chosen (if possible early buds), and their indications should be alike noted—always the same and from year to year being noted.

Oranges.—Mention whether Schouten's or Moffet's scale and whether the variety is the same. Schouten's are preferred. They may be had from Messrs. Allen and Son's, 50, Prince Street, and at Mr. Messrs. Ails, 60, Prince Street, Edinburgh.

Electricity.—Thin bars 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.

SCOTTISH METEOROLOGICAL SOCIETY.

Observations taken at Aberdeen, County of Aberdeen, in Lat. 57° 9', Long. 2° 8', Height above Sea 90 feet.

Distance from Sea 2 miles. During the MONTH of December 1857.

Days of Week.	Days of Month.	BAROMETER.		SELF-REGISTERING THERMOMETERS.				HYGROMETER.				WIND.				RAIN.		CLOUD.	SUNSHINE.	THERMOMETERS under Ground.		TEMPERATURE of SPRING or WELL.	TEMPERATURE of SEA.	OZONE.	ELECTRICITY.	GENERAL REMARKS. As to occurrence of Thunder, Lightning, Storms, Hail, Meteors, Remarkable Depression or Elevation of Barometer, etc. Mention the hour at which these began and ended.		
		h. A.M.		h. P.M.		Max. in Air.	Min. in Air.	Max. Black bulb in Sun.	Min. Black bulb over Grass.	h. A.M.		h. P.M.		Direction.	Mean Force 1-6.	Direction.	Mean Force 1-6.			Days on which it fell.	Amount.						9 h. A.M.	
		Barometer.	Attached Thermometer.	Barometer.	Attached Thermometer.					Dry bulb.	Wet bulb.	Dry bulb.	Wet bulb.														3 inches.	12 inches.
1																									1-few drops rain, 2nd light rain, 3rd			
2																									2 rain			
3																									3r Gale 3 ^d			
4																												
5																												
6																												
7																												
8																									3r			
9																									Gale 8 th			
10																									1r			
11																												
12																												
13																												
14																									2r			
15																									2r			
16																												
17																												
18																									3r Gale 18 th			
19																									3r aurora			
20																									1r 2 mock suns in E. at 1 P.			
21																									3r aurora			
22																												
23																									1r			
24																									2r			
25																									Gale 24 th			
26																									2r lunar halo			
27																												
28																									2r			
29																									2r			
30																									2r			
31																												
Sums.																												
Means.																												
Index Errors.																												
Correc- tion 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		

Barometer, mean corrected reading of Column No. 1 (A.M.),.....=..... Column No. 3 (P.M.),.....=..... Barometer, Highest observed reading of Month,.....=.....
Diameter of tube.....inch; correction for capillarity to be added,.....+..... Capillarity,.....=+..... Lowest do. do.,.....=.....
Sum,..... Sum,..... Difference, or Monthly Range,.....=.....
Correction for Temperature from Column No. 2 to be deducted,.....=..... Temp. from Col. 4,.....=.....
Sum,..... Sum,.....
Correction for Height above Sea-level,.....feet, to add,.....+..... Height,.....=+.....
Barometer corrected and reduced to 32° and Sea-level,.....=..... At 32° and Sea-level,.....=.....

SUMMARY OF THE WINDS.											
Direction.	N	NE	E	SE	S	SW	W	NW	Calm or Variable.	Mean Force.	
A.M.	0	0	0	0	0	26	3	1	1	166	204
P.M.	0	0	0	0	2	19	5	2	3	243	

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,.....on the.....
Lowest do. do.,.....on the.....
Difference, being Monthly Range,.....
Mean of Self-Registering Thermometers,.....
Mean Daily Range,.....
Greatest Daily Range,.....

* 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.

(Signed) Alex Cruck Shank
(Designation) 12 Rose St Aberdeen

INSTRUCTIONS FOR MAKING METEOROLOGICAL OBSERVATIONS.

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

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

Barometer.—Barometers of Messrs. A. D. and Son's construction are recommended; but any instruments may be used which have adjustable surfaces, and have been compared. Before this instrument is suspended for use it should be examined in order to ascertain whether the space above the mercury is free from air. This is done by inclining the instrument somewhat from the vertical position, when, if free from air, the mercury will settle against the upper end of the tube with a sharp 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 Thermometer and Hygrometer.—These should be placed alongside of each other, in a place freely exposed to the air, but protected from sunshine, and from reflected heat, as well as from radiation and from rain, and as near as may be four feet from the general surface of the ground. Different contrivances are used for this purpose, either a double ventilated box with louver-boarded sides, fixed at a north window, and projecting 12 inches from the wall, so as to allow a free current of air to pass between the box and the wall; or in a double west-side ventilated box with louver-boarded sides, fixed in an exposed place, and if possible over grass. Whatever means are finally decided on, the position of the instruments should be mentioned, and should not be changed (without due notice being given to the Secretary), in order that the results of one month's observations may be strictly comparable with those of another.

The *Self-Registering Thermometer* 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 however the muslin seems to be foul. The bulb should be covered with thin tissue or blotting paper below the muslin, and the muslin should always be thoroughly wetted, and freed from starch, before being used; and the cotton wick which conducts moisture to it should be previously soaked in a solution of washing soda, and then in pure water, before being attached, in order that

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

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

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

Clouds.—The Society recommends observers to adopt the Howard nomenclature of clouds. The scale of cloud in the visible sky is reckoned from 0 to 10. Thus, a sky quite free from cloud is 0; a sky half covered with cloud is 5; and the whole visible sky even more of the visible sky without covering three-fourths or even more of the visible sky with clouds often cover the sunning 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 persons to have a powerful effect in dispelling clouds, it would be well to note in the general observations any facts bearing on this point, for a few days (4 or 5 nights, as the case may be) before and after every full moon; and the same observations ought to be made at the periods of new moon.

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

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

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

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

Mosses, Anemomorphs, Remarkable Depression or Elevation of Barometer, Remarkable Falls of Rain, Frost or Snow, Thunder and Lightning, etc., should be specially noticed, together with the exact hour at which they were first seen, their continuance, and direction. *Birding, Locusts, and Flowering of Trees.*—It is necessary to bear in mind that varieties of the same species of tree differ widely in their times of budding and flowering. *Individual* trees or shrubs of each kind should therefore be chosen (if possible early kinds), and their indications should be alone noted—always the same plant from year to year being noticed.

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

OBSERVATIONS IN CONNECTION WITH THE PERIODICAL RETURN OF THE SEASONS.

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

SHRUBS, ETC.	First In Blossom.	FRUITS.	First in Blossom.	Fruit Ripe generally.	MIGRATORY BIRDS.	First Arrival.	Departure.
Barberry,.....		Apples.....			Cuckoo.....		
Bountree or Elder.....		Black Currant.....			Curlew.....		
Broom.....		Cherry.....			House-Swallow.....		
Hazel.....		Gean.....			Lapwings.....		
Hawthorn.....		Gooseberry.....			Plover.....		
Holly.....		Peach.....			Sand-Martin.....		
Laburnum.....		Pear.....			Starlings.....		
Lilac.....		Plum.....			Swan.....		
Mezeron.....		Strawberry.....			Rail.....		
Momian 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 short supply, and whether any have suffered from blight, diseases, etc. Whether Epizootic disease prevails among Cattle; and the Agricultural condition of the district generally.

EDINBURGH

21, Rutland Street,

Sec., Meteorological Society,

DR STARK,

To

