

SCOTTISH METEOROLOGICAL SOCIETY.

Observations taken at *Drith Park Aberdeen*, County of *Aberdeen*, in Lat. *57° 9' N*, Long. *2° 6' W*, Distance from Sea *3* miles.Height of Cistern of the Barometer above Mean Sea-Level *44* feet, above Ground *4* feet.During the MONTH of *January* 1902.

The Hours of Observation are of Greenwich Time.

ELECTRICITY.	Days of Month.	BAROMETER.				SELF-REGISTERING THERMOMETERS. Read Daily, at 9 P.M.				HYGROMETER.				Rain.	WIND.				CLOUDS.				THERMOMETERS under Ground.				SEA.	OZONE.	GENERAL REMARKS. As to occurrence of Thunder, Lightning, Storms, Hail, Meteors, Remarkable Depression or Elevation of Barometer, Prevalent Diseases, etc. Mention the hour at which Storms, including Thunder and Lightning, began and ended.	Days of Month.																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																														
		9 h. A.M.		9 h. P.M.		Protected in Shade, 4 feet above Ground.		Exposed Black Bulbs. Sun's rays		9 h. A.M.		9 h. P.M.			Readings of the H. Cup Anemometer.		9 A.M.		P.M.		9 h. A.M.		Temperature of Well at depth of feet, 20.		Temperature at 1 fathom, and possibly.						0-10.																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																													
		Barometer.	Attached Thermometer.	Barometer.	Attached Thermometer.	Max.	Min.	Max. in Sun's rays	Min. on Grass.	Dry bulb.	Wet bulb.	Dry bulb.	Wet bulb.		No. of hours in which it fell.	Amount in inches.	9 h. A.M.	9 h. P.M.	Velocity (0-10), and Species.	Amount (0-10), and Species.	Velocity (0-10), and Species.	Amount (0-10), and Species.	No. 3 inches.	No. 12 inches.	No. 22 inches.	No. 3 inches.					No. 12 inches.	No. 22 inches.	9 A.M.	9 P.M.																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																										
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BAROMETER, "corrected Mean" at 9 A.M., minus the Correction $\frac{1}{10}$ for Temp. (Col. 2), = *29.829*
"Corrected Mean" of Barometer at 9 P.M., minus the Correction $\frac{1}{10}$ for Temp. (Col. 4), = *29.875*
Mean at Station, corrected, and at 32°, = *29.852*
Correction for height, feet above Mean Sea-Level, = *50*
Mean, reduced to 32°, and Sea-level, = *29.802*
Highest Reading, corrected for Index error, on the 31 th, = *31.049*
Lowest Do. Do., on the 2 th, = *28.810*
Difference, or Monthly Range, = *2.239*

S.-R. THERMOMETER, (in shade, etc.), Highest in Month, (corrected for Index Errors), on the 6 th, = *53.0*
Lowest in Month, corrected for Index errors, on the 31 th, = *11.5*
Difference, or Monthly Range, = *41.5*
"Corrected Mean" of all the Highest, (Col. 5), = *41.6*
"Corrected Mean" of all the Lowest, (Col. 6), = *31.3*
Difference, or Mean Daily Range, = *10.3*
** Calculated Mean Temperature of Month, = *36.5*
S.-R. THERMOMETER, Black Bulb in Sun, Highest, (corrected for Index Errors), on the th, =
"Corrected Mean," (Col. 7), of Black Bulb, Max. in Sun, =
Lowest at Night, Black Bulb (corrected for Index errors), on the th, =
"Corrected Mean," (Col. 8), of Black Bulb, Min. on grass, =
Difference of above means or range ("exposed"), =

HYGROMETER, Mean (corrected) A.M. and P.M. Reading of Dry Bulb, (Cols. 9 and 11), = *36.0*
Mean (corrected) A.M. and P.M. Reading of Wet Bulb, (Cols. 10 and 12), = *34.3*
Computed Temperature of Dew-Point, = *31.8*
Do. Elastic Force of Vapour, = *1.80*
Do. Weight of Vapour in a Cubic Foot of Air, =
Relative Humidity (Saturation = 100), = *85*
RAIN fell on 16 Days; Amount in Inches, = *1.70*

WIND.		SUMMARY.									
Direction.		N	NE	E	SE	S	SW	W	NW	Calm or Variable.	Mean Force.
A.M.		1	-	-	-	1	8	16	5	-	1.70
P.M.		1	-	-	-	1	9	16	4	-	1.70
Mean.		1	0	0	0	1	8	16	5	0	1.70

Observations made and
Return verified by(Signed) *Peter Mackenzie* observer

OBSERVATIONS,

correct centering of the scale of every instrument; the rejection of Thermometers the frameworks of which are not likely to stand exposure to the weather, as shown in the past by repeated and annoying breakages of Thermometers of similar construction; and as regards Maximum Thermometers, either Negretti and Zambra's, or Phillips's, whether they will act as the highest temperatures they may be required to register. By the laws of the Society, Members and Observers have a right to have their instruments compared by the Secretary, and to advise with him regarding the purchase of instruments. Very great care should be bestowed on the Observations of the Wind, the accuracy of which, both as regards Direction and Force, is so essential towards the right discussion of many of the more important problems of the science.

A Wind-Vane ought to be elevated at least 12 feet above surrounding objects. When it oscillates incessantly, the mean direction should be taken. In all cases, but especially when the Vane is stationary, and when the wind is feeble, reference may be made to the direction of smoke, etc., in well-exposed situations. Careful observations are recommended to be made on the changes in the direction of the wind; and during storms, extra observations at every hour of Greenwich time. Such a system of simultaneous observation, pursued at different Stations, is likely to give highly valuable and important results, particularly in connection with the system of thickly-planted Stations over a limited district round Edinburgh called STORM STATIONS, in the course of being established by the Society for the systematic investigation of the relation of the force of the wind to BAROMETRIC GRADIENTS, and other points connected with storms.

The Council would recommend the Hemispherical Cup Anemometer, a self-registering instrument which shows the amount of Wind that passes it per day; from which also the mean Velocity of the Wind at the time of observation may be ascertained. For indicating the Force of the Wind at any particular hour of observation, the Pressure Anemometers recently brought under the notice of the Society, by Mr. T. Stevenson, the Honorary Secretary, and Mr. R. Ballingal, the Society's Observer at Pallabus, are recommended as likely to secure uniformity in making observations on the Force of the Wind.

Many causes conspire to produce anomalies in Rain Returns, arising partly from the difficulty of obtaining a Rain Gauge, perfectly unobjectionable situation for observation, and partly from the defective nature of the instruments used. The Rain Gauge should not be placed on a slope or terrace, but on a level piece of ground, in as open a situation as the Observer can secure for it. As it is often difficult to obtain a position as free and unobstructed by surrounding objects as is desirable, care should be taken to place it at some distance from shrubs, trees, buildings, or other obstructions, at least as many feet from their base as they are in height. The more important directions, towards which it is most desirable to have a free exposure, are, in the order of their importance, S.W., N.E., S.E., S., and W. The rim of the gauge must be perfectly level, and fixed so that it will remain level in all weathers, and be at a height of one foot above ground, over grass. In such gauges as Fleming's, which are furnished with a measuring-rod attached to its height only, the rod ought to be fixed down, and the float rise to its height only at the time the instrument is read, it being found that a stem projecting above the rim of the gauge seriously interferes with the proper measurement of the Rain-fall. When a measuring-glass is used, care ought to be taken to hold it quite perpendicular. The Rain Gauge ought to be read daily at 9 A.M., and the reading entered in the Returns of the previous day. If the Gauge is read once a month, the reading is to be made on the first of the month, and the amount entered for the previous month. Snow-falls may, for convenience, be registered in the rain columns, under the following conditions:—When a Snow-shower occurs, it should be noted in the 'Remarks,' and the letter S affixed to the depth of water received in the Gauge, and the depth of the snow must be measured in some open place where

any one, when the column of spirit is to separate. Let the thermometer be taken in the hand by the end farthest from the bulb, and the bulb raised above the head, and then forcibly swung down towards the feet; the object being on the principle of centrifugal force to break down the detached portion of spirit still it unites with the column. A few throes, or swinging strokes, will generally be sufficient for the purpose; after which the Thermometer should be placed in a slanting position to allow the rest of the spirit still adhering to the sides of the tube to drain down to the column. But no other method must be adopted if the portion of spirit in the top of the tube be small. That should be applied slowly and cautiously to the top end of the tube where the detached portion of spirit, which, being turned into vapor by the heat, will condense on the surface of the unbroken column of spirit. There must be taken that care that the heat is not applied too quickly; for, if this be done, the tube will break and the instrument be destroyed. The best way to apply the requisite amount of heat is by bringing the end of the tube down towards a heated fluid from a gas-burner; or, if gas be at hand, a piece of heated metal will serve instead.

The bulbs of the Thermometers for registering the greatest heat from the sun's rays, and the least from radiation during night, have a black coating, which may easily be made or mended, by the application of a mixture of lampblack and printer's ink. They are placed in shallow enamelled boxes, whose sides protect the bulbs from the wind, and the Maximum should be freely exposed to the sun, and the Minimum should rest on wooden supports a few inches from the surface of the grass, in an open situation. Snow must not be allowed to cover either of these Thermometers; nor the sun's heat to affect the Minimum Thermometer by distillation. Black-bulbs enclosed in 'glass jackets' may also be used, being indented preferable to the open. It must, however, be added, that the whole subject of the observation of Solar and Terrestrial Radiation is not, in a sufficient

during night, having black coating, which may easily be made or mended, by the application of a mixture of lampblack and printer's ink. They are placed in shallow unclackened boxes, whose sides protect the bulbs from the wind, and the Maximum should be freely exposed to the sun, and the Minimum should rest on wooden supports a few inches from the surface of the grass, in an open situation. Snow must not be allowed to cover either of these Thermometers; nor the sun's heat to affect the glass Thermometer by distillation. Black-bulbs enclosed in 'glass jackets' may also be used, being inlaid preferable to the former. It must, however, be added, that the whole subject of the observation of Solar and Terrestrial Radiation is not yet in a sufficiently advanced state to warrant the exclusive recommendation of any one of these methods.

The Hygrometer in use at the Society's Stations consists of two *Ravand Wet bulb* Thermometers usually, but not necessarily, mounted on one frame. As apparently slight deviations from the improved form of this apparatus seriously vitiate the Hygrometrical Observations, Observers are specially requested to attend to the following conditions.—The bulbs must hang down at least an inch from the scales, and frame to which they are attached; the frame must be such as will bring the tubes forward an inch from any board on which it may be suspended; the water-tub must be covered, and altogether placed to the side, and a little below the level of the wet bulb, but in no case under the bulb; the muslin must be of medium fineness, and fastened at the neck of the bulb by the cotton, which also supplies it with water. It must be clean and the water pure. In frosty weather, observation is a matter of great delicacy, and must be made with great care. The bulb must be moistened by immersion from 15 to 30 minutes before the hour of observation. From the film of ice thus formed evaporation will proceed as from the moist cloth in ordinary circumstances.

In reading the Thermometer great care must be taken to bring the eye exactly opposite the tip of the index or column of mercury. The reading ought to be taken to tenths of a degree, and noted in decimals. Thus the Thermometer will be read— $39^{\circ}.9$, $40^{\circ}.0$, or $40^{\circ}.1$; or again, $40^{\circ}.5$, $40^{\circ}.6$, or $40^{\circ}.6$, according as it indicates a little under, an exact coincidence with, or a little over 40° , or $40^{\circ}.5$, respectively. So also in the case of the $40^{\circ}.5$ and $40^{\circ}.8$ Thermometers. In reading Rutherford's Minimum Thermometer, the indication of that end of the index which is next the surface of the Spirit is alone noted. On opening the Thermometer Box, the Dry and Wet Bulb Thermometers are to be first, and rapidly, read, inasmuch as they are readily affected by heat on the person of the Observer.

The Hygrometer is read at 9 A.M. and 9 P.M. The Self-Registering Thermometers are read at 9 P.M. only, as indicating the greatest and least degrees of temperature in the 24 hours preceding. It is not a matter of difference when the Self-Registering Thermometers are read, since, in winter at least, the extremes may occur at any hour; and it is necessary to refer their occurrence to their proper meteorological periods in the Society's schedules, the indications registered on the face of these of a series of phenomena commencing at 9 P.M. on the 1st, and extending till 9 P.M. on the 3d.

No instrument ought to be used for Meteorological purposes till it has been carefully tested by comparison with a standard Thermometer. When such Thermometers, as are not graduated on the stem, but merely on an attached scale, undergo repairs, they are very liable to be moved from their position on the Scale, and ought never afterwards to be used without being re-tested. The Self-Registers, especially the Minimum Thermometers, ought frequently to be compared with the dry bulb of the Hygrometer. The freezing-point of each thermometer, marked by a scratch on the tube, ought to be tested once a year, in snow or melting ice.

In selecting instruments, the following points require attention.—The divisions of the vernier of Barometers in reference to the scales, and the perfect freedom of the Barometer man air; the

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correct numbering of the scale of every instrument; the rejection of Thermometers the frameworks of which are not likely to stand exposure to the weather, as shown in the past by repeated and annoying breakages of Thermometers of similar construction; and as regards Maximum Thermometers, either Negretti and Zambra's, or Phillips's, whether they will act as the highest temperatures they may be required to register. By the laws of the Society, Members and Observers have a right to have their instruments compared by the Secretary, and to advise with him regarding the purchase of instruments. Very great care should be bestowed on the Observations of the Wind, and the Force, is so essential towards the right discussion of many of the more important problems of the science. A Wind-Vane ought to be elevated at least 12 feet above surrounding objects. When it oscillates incessantly, the mean direction should be taken. In all cases, but especially when the Vane is stationary, and when the wind is feeble, reference may be made to the direction of smoke, etc., in well-exposed situations. Careful observations are recommended to be made on the changes in the direction of the wind; and during storms, extra observations are recommended at different Stations, a system of simultaneous observation, pursued at different Stations, is likely to give highly valuable and important results, particularly in connection with the system of thickly-planted Stations over a limited district round Edinburgh called STORM STATIONS, in the course of being established by the Society for the systematic investigation of the relation of the force of the wind to BAROMETRIC GRADIENTS, and other points connected with storms. The Council would recommend the Hemi-spherical Cup Anemometer, a self-registering instrument which shows the amount of Wind that passes it per day; from which also the mean Velocity of the Wind at the time of observation may be ascertained. For indicating the Force of the Wind at any particular hour of observation, the Pressure Anemometers recently brought under the notice of the Society by Mr. T. Stevenson, the Honorary Secretary, and Mr. R. Balingh, the Society's Observer at Ballabus, are recommended as likely to secure uniformity in making observations on the Force of the Wind.

Many gauges conspire to produce anomalies in Rain Returns, arising partly from the difficulty of obtaining a perfectly unobjectionable situation for observation, and partly from the defective nature of the instruments used. The Rain Gauge should not be placed on a slope or terrace, but on a level piece of ground, in as open a situation as the Observer can secure for it. As it is often difficult to obtain a position as free and unobstructed by surrounding objects as is desirable, care should be taken to place it at some distance from shrubs, trees, buildings, or other obstructions, at least as many feet from their base as they are in height. The more important directions, towards which it is most desirable to have a free exposure, are, in the order of their importance, S.W., N.E., S.E., S., and W. The rim of the gauge must be perfectly level, and fixed so that it will remain level in all weathers, and be at a height of one foot above ground, over grass. In such gauges as Fleming's, which are furnished with a measuring-rod attached to a float, the rod ought to be fixed down, and the float rise to its height only at the time the instrument is read, it being found that a stem projecting above the rim of the gauge seriously interferes with the proper measurement of the Rain-fall. When a measuring-glass is used, care ought to be taken to hold it quite perpendicular. The Rain Gauge ought to be read daily at 9 A.M., and the reading entered in the Returns of the previous day. If the Gauge is read once a month, the reading is to be made on the first of the month, and the amount entered for the previous column.

Snow-falls may, for convenience, be registered in the rain column, under the following conditions:—When a Snow-shed occurs, it should be noted in the Returns, and the letter S annexed to the depth of snow received in Gauge. The depth of the snow must be measured in some open place where no drift is observed, and the Gauge must be at least six inches up in the indication of the Rain Gauge. For wind, rain, and snow, as indicated in every column, the Observer cannot be too careful to register observations only; and nothing that partakes of the nature of deduction or inference.

Convenient abbreviations for the nomenclature of Clouds will be found on the other side. The amount of Cloud ought to be estimated from the greater or less obscuration of the sky overhead (i.e. within 20° or 30° of the zenith). The strata of Clouds that appear near the horizon are viewed obliquely; and thus, being unable to judge of their amount, we ought not to take them into account in the Clouds' column. Remarks, their appearance and changes may be noted among the Returns. The amount of Cloud is free from Clouds 0 to 10; thus, when the sky overhead is free from Clouds it is entered 0, when half-covered by Clouds 5, wholly covered, 10, and so on.

Observations of the Clouds should be made at 9 A.M. and at sunset as illustrating the condition and currents of the upper and lower regions of the atmosphere. The entries in the schedule are to be made in the following manner:—Thus, in the column Velocity and Direction, S. W. _____ will indicate that the upper strata of Clouds travel with extreme velocity from S.W., and those in the lower regions from W. Again, in the second column, 4, st. _____ will indicate that the higher regions are covered to the amount of 4-tenths with stratus Clouds; and that the sky is further obscured to the extent of 2-tenths by lower Clouds of the cumulo stratus kind.

Remarks on peculiar Clouds, accompanied with drawings, will assist materially in the development of a more exact nomenclature of Clouds, as well as throw light on the electrical, and other of the more obscure phenomena of Meteorology.

The approximate number of Hours in which objects in the sun's rays cast shadows, should be entered in the proper column.

As the germination and growth of crops and plants generally depend greatly on the temperature of the soil,—its amount and constancy,—the Council recommend that Observations in this interesting department be made at 9 A.M., by Thermometers permanently fixed in the soil, their bulbs being sunk to depths of 3, 12, and 22 inches, and the stems above ground protected from the sun's rays and fitted with sloping tin collars, to prevent rain-water being conveyed to the bulbs by the stems or wooden frames.

A knowledge of the Temperature of the Sea is not only in itself, but in its relations to that of our island, a most important branch of Meteorology. The Council therefore recommend that the Temperature of the Sea be carefully taken by a properly constructed apparatus, from boats, or, if this be impracticable, from the ends of piers and rocks round the coast, where it is not influenced by that of river water, and as little exposed as possible by currents sweeping along the coast, and thus acquiring the temperature of the land, either greatly heated by the sun or cooled by nocturnal radiations. At or near the mouth of high

water, in cases where the observations cannot be taken daily. When convenient, extra Sea Observations might be taken for other days, and greater depths, noting always the Temperature of the Air and the Hour of Observation. It is also very desirable that observations on the daily Maxima and Minima by Thermometers continuously immersed be instituted at points along the coast, by the method proposed by Mr. T. Stevenson, and already commenced at Peterhead and Liverpool.

The Temperature of the water at the bottom of Wells ought, when practicable, to be taken, both the depth of the Temperature Well and of the water being noted.

Mention what Test-Papers are used, Schönbein's or Moffat's, etc.

Ozone.—The Paper is affixed by a pin to a board in the Thorometer Box; and the indications registered at 9 A.M. and 9 P.M. It is desired that these indications be registered in connection with the force and direction of the wind at the time of observation, in the following manner:—thus $\frac{82^{\circ}W}{S}$, as an Ozone entry in the schedule will indicate that the Ozone paper is once set on the scale, that the wind is from the N.W., and that its force on the scale 0–5 is 4, or blowing fresh.

Too much importance cannot be attached to the electric condition of the atmosphere in connection with terrestrial magnetism, barometrical, thermometrical, and meteorological phenomena generally. A proper electro-meteorological observatory is, in truth, necessary to every complete meteorological observatory.

The Remarks column is unavoidably too narrow. Some of the most valuable Observations that can be taken are those for which no rules can be given nor hours assigned. The use of contractions ought, therefore, to be taken every advantage of, and a list of such as are in general use is given at the foot of the column. Besides special and extraordinary Observations, great prominence ought to be given in this column to prevalent Diseases, differences in character, colour, velocity, and direction between the Lower and Upper Strata of clouds, the Colour of the Sky, &c. Remarks ought to be made on the occurrence of Meteors, Auroræ Boreales, remarkable depressions, elevations, and fluctuations of the Barometer, Thunder-Storms, and remarkable falls of Snow, Hail, or Rain, the Hour of Storms of Wind commencing, attaining their maximum, and ending, as well as such Notes on Storms as have been hinted at above. When lofty hills are in the vicinity of a Station, the Height of Clouds and of the Snow-line in winter should be recorded.

By the use of abbreviations, the state of the weather at 9 A.M. and 9 P.M. should be registered, either in two columns, otherwise occupied, or ruled off for the purpose, from the column of 'Remarks.'

Observations in connection with the Periodic Return of the Seasons.

Observations in Seasons, possess not only great scientific value, but connection with are of considerable importance in connection with the Periodic Re-Agriculture, Horticulture, and Natural History. The Council would direct the special attention of Observers to published Summaries may fairly represent the whole of Scotland. Observations ought to be confined to individual trees and shrubs; to particular species of birds, and, in the case of crops, to specified sorts reared from year to year on a selected piece of ground or farm. The Annual Table, published yearly in the Society's Journal, will indicate the species of plants and animals to which special attention is more particularly directed.

The Council recommend Observers, before purchasing new instruments, and in repairing old ones, to communicate with the Meteorological Secretary, in order that every instrument may be examined and improved before being used; and they consider it necessary that he should have full power to reject any instrument which, on being presented for comparison, does not afford him satisfaction.

(By Order)

A. B.
EINSHURCH,

OBSERVATIONS IN CONNECTION WITH THE PERIODICAL RETURN OF THE SEASONS.

FOREST TREES.	Alder,	Beech,	Birch,	Elm,	Larch,	Oak,	Sycamore or Plane,
In Flower.							
In Leaf.							
Leaf buds first Appear.							
Drosted of Leaves.							
CROPS.							
Meaning variety.							
Planting.							
Sowing or Above Ground.							
Appearing In Ear or Raked.							
First Cut							

(By Order) A. B.

OBSERVATIONS IN CONNECTION WITH THE PERIODICAL RETURN OF THE SEASONS.

[illegible]

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

(By Order) A. B.



SCOTTISH METEOROLOGICAL SOCIETY.

Observations taken at Guthrie Park Aberdeen County of Aberdeen, in Lat. 47° 9' N, Long. 2° 6' W, Distance from Sea 2 miles.Height of Cistern of the Barometer above Mean Sea-Level 44 feet, above Ground 4 feet.During the MONTH of February 1903.

The Hours of Observation are of Greenwich Time.

ELECTRICITY.	Days of Month.	BAROMETER.								SELF-REGISTERING THERMOMETERS, Read Daily, at 9 P.M.				HYGROMETER.				Rain.	WIND.				CLOUDS.				THERMOMETERS under Ground.			SEA.	OZONE.	GENERAL REMARKS.		Days of Month.																											
		9 h. A.M.		9 h. P.M.		Protected in Shade, 4 feet above Ground.		Exposed Black Bulbs.		9 h. A.M.		9 h. P.M.		No. of hours in which it fell.	Amount in inches.	9 h. A.M.			9 h. P.M.		Readings of the H. Cup Anemometer No.	9 A.M.		P.M.		Sunshine. Hours.	9 h. A.M.								Temperature of Well at depth of feet, No.	Temperature of Air and Dew, No.	0-10.	9 A.M.	9 P.M.																						
		Barometer. No.	Attached Thermometer.	Barometer. No.	Attached Thermometer.	Max. No.	Min. No.	Max. in Sun's rays No.	Min. on Grass. No.	Dry bulb. No.	Wet bulb. No.	Dry bulb. No.	Wet bulb. No.			Direction.	Force.		Direction.	Force.		Velocity (0-6) and Direction.	Amount (0-10), and Species.	Velocity (0-10), and Direction.	Amount (0-10), and Species.		No. 3 inches.	No. 12 inches.	No. 22 inches.																																
																																								No.	Inches.	No.	Inches.	No.	Inches.	No.	Inches.	No.	Inches.	No.	Inches.	No.	Inches.	No.	Inches.	No.	Inches.	No.	Inches.	No.	Inches.
1	30.970	24	30.845	26	35.418	0		25.2	24.0	36.0	35.0	0.00	SW	1	NW	1		0	8												fair hard frost after P.M.	1																													
2	30.655	38	30.500	40	40.000	35.0		33.0	32.0	38.2	37.0	0.00	SE	1	N	1		10	10											fair fine all day	2																														
3	30.350	39	30.305	40	41.5	37.0		40.0	39.4	37.0	36.2	0.01	SE	1	SE	1		6	8											damp slight rain at times	3																														
4	30.250	41	30.095	41	37.0	32.0		33.6	33.0	33.6	33.0	0.00	SW	1	SW	1		8	6											fair fine all day	4																														
5	29.900	39	29.600	40	38.0	30.0		33.0	31.5	33.5	32.0	0.00	W	1	W	1		8	0											do do	5																														
6	29.390	34	29.330	38	37.6	31.0		32.5	32.0	34.8	34.0	0.00	SW	1	NW	1		3	8											fair fine some sleet from	6																														
7	29.400	38	29.470	34	32.5	29.0		31.4	29.5	32.0	31.0	0.01	NW	1	W	1		2	0											snow showers	7																														
8	29.445	31	29.355	32	32.0	21.5		22.0	20.0	25.0	23.5	0.00	SW	1	SW	2		0	0											fair all day	8																														
9	29.300	32	29.450	33	35.5	18.0		25.2	25.0	29.0	28.0	0.14	W	1	NW	1		2	4											fair, snow showers P.M.	9																														
10	29.500	36	29.520	31	33.5	26.0		28.5	28.0	33.5	33.0	0.04	NW	1	W	2		0	0											fair all day	10																														
11	29.550	34	29.690	31	30.0	24.5		27.0	26.0	25.0	24.0	0.00	NW	1.5	W	1		0	0											even snowing, fair	11																														
12	29.750	34	29.825	32	34.0	21.0		24.0	23.0	26.0	25.0	0.00	W	1	W	1		0	0											fair all day	12																														
13	29.750	36	30.050	37	34.0	24.0		29.8	29.0	34.0	33.0	0.02	NW	1	W	1		0	2											do do	13																														
14	29.805	34	29.800	35	39.0	15.0		34.2	33.8	36.5	35.0	0.03	SW	2	W	1		8	0											dull, sleet, then fair	14																														
15	30.140	35	30.050	37	40.4	21.8		23.5	22.0	38.0	37.5	0.00	W	1	SW	2		0	4											fair all day	15																														
16	29.945	38	29.945	38	40.0	36.5		39.0	38.0	36.0	34.8	0.00	SW	2	SW	1		8	5											fair fresh wind, frost P.M.	16																														
17	29.900	38	30.050	42	39.4	28.0		30.6	29.8	35.0	34.0	0.00	SW	1	SW	1		8	3											fair all day	17																														
18	30.090	36	30.075	40	39.2	30.0		31.0	30.0	39.2	39.0	0.04	SW	1	S	1		4	10											fair, fog afternoon	18																														
19	30.080	41	30.150	44	41.0	26.6		34.0	32.6	38.0	37.0	0.02	SW	1	SW	1		4	10											dull all day, quite fresh	19																														
20	30.190	42	30.100	42	38.5	36.0		37.5	37.0	38.0	36.6	0.05	S	1	S	1		haze	10											dull damp haze, some sun P.M.	20																														
21	29.960	42	29.890	40	37.2	35.0		36.2	35.2	35.5	34.6	0.00	S	1	SW	2		10	haze											do do clear P.M.	21																														
22	29.800	41	29.725	43	42.0	34.0		38.8	38.0	40.5	40.0	0.01	S	1	S	1		8	10											damp fair all day	22																														
23	29.600	44	29.655	43	46.0	39.6		41.2	40.8	42.2	41.5	0.04	S	1	S	1		damp haze	10											dull damp haze, most of day	23																														
24	29.650	44	29.710	48	44.4	41.0		42.4	41.8	46.5	46.0	0.36	S	1	SE	1		10	10											dull some rain	24																														
25	29.750	45	29.800	47	44.8	39.0		40.2	40.0	39.2	37.8	0.03	SE	1	S	1.5		10	6											rain heavy at times, fair P.M.	25																														
26	29.750	43	29.675	43	42.0	36.0		38.0	35.0	37.0	35.0	0.00	SE	1.5	SE	2		6	6											fair drying wind	26																														
27	29.450	42	29.400	44	38.0	36.0		37.5	34.2	35.5	35.0	0.14	SE	2	SE	2		8	10											fair cool drying wind	27																														
28	29.400	42	29.450	42	40.0	34.5		38.0	36.5	40.0	38.5	0.14	SE	1	SE	1		8	8											dull damp rain	28																														
29																																29																													
30																																30																													
31																																31																													
Sums.		15712	2	12125	91	125	134			127	106	145	135	108		320	345						130	148																																					
Means.		29.854	37.9	29.850	38.7	38.3	29.3			33.1	31.0	35.3	34.0			1.4	1.2					4.6	5.3																																						
+ Total Corrections for Instrumental Errors.		-0.10		-0.10																																																									
+ Corrections for Diurnal Range.																																																													
"Corrected Means."																																																													
No. of Column.		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30																														

NOTATION USED IN GENERAL REMARKS.					
a.	denotes aurora.	m.	denotes meteor.		
ci.	cirrus.	ms.	meteors.		
ci.-cu.	ciro-cumulus.	n.	nimbus.		
ci.-s.	ciro-stratus.	r.	rain.		
cu.	cumulus.	h. r.	heavy rain.		
cu.-s.	cumulo-stratus.	c. h. r.	continued heavy rain.		
d.	dew.	s.	stratus.		
f.	fog.	sc.	scud.		
fr.	frost.	sleet.	sleet.		
h.-fr.	hoar-frost.	s.	snow.		
h.	haze.	so. ha.	solar halo.		
h. d.	heavy dew.	sq.	squall.		
hl.	hail.	squ.	squalls.		
l.	lightning.	t.	thunder.		
li. cl.	light clouds.	t. s.	thunder-storm.		
li. sh.	light showers.	w.	wind.		
lu. co.	lunar corona.	g.	gale of wind.		
lu. ha.	lunar halo.				

TABLE FOR ESTIMATING FORCE OF WIND.					
Estimated Force, 0-3.	Common Designation.	Estimated Force, 0-6.	Common Designation.	Estimated Force, 0-9.	Common Designation.
0	Calm	1-5	Light breeze	4	Blowing hard
0.5	Very light air	2	Fresh breeze	5	Blowing a gale
1	Light air	3	Very fresh	6	Violent gale

BAROMETER, "corrected Mean" at 9 A.M., minus the Correction \ddagger for Temp. (Col. 2), \ddagger = 29.818
"Corrected Mean" of Barometer at 9 P.M., minus the Correction \ddagger for Temp. (Col. 4), \ddagger = 29.812
Mean at Station, corrected, and at 32", = 29.815
Correction for height, feet above Mean Sea-level, = 51
Mean, reduced to 32", and Sea-level, = 29.866
Highest Reading, corrected for Index error, on the 1 th, = 30.970
Lowest Do. Do., on the 9 th, = 29.300
Difference, or Monthly Range, = 1.670

S.R. THERMOMETER, (in shade, etc.), Highest in Month, (corrected for Index Errors), on the 23 th, = 46.0
Lowest in Month, corrected for Index errors, on the 1 th, = 13.0
Difference, or Monthly Range, = 33.0
"Corrected Mean" of all the Highest, (Col. 5), = 38.3
"Corrected Mean" of all the Lowest, (Col. 6), = 29.3
Difference, or Mean Daily Range, = 9.0
** Calculated Mean Temperature of Month, = 33.8
S.R. THERMOMETER, Black Bulb in Sun, Highest, (corrected for Index Errors), on the th, =
"Corrected Mean," (Col. 7), of Black Bulb, Max. in Sun, =
Lowest at Night, Black Bulb (corrected for Index errors), on the th, =
"Corrected Mean," (Col. 8), of Black Bulb, Min. on grass, =
Difference of above means or range ("exposed"), =

HYGROMETER, Mean (corrected) A.M. and P.M. Reading of Dry Bulb, (Cols. 9 and 11), = 34.2
Mean (corrected) A.M. and P.M. Reading of Wet Bulb, (Cols. 10 and 12), = 32.5
†† Computed Temperature of Dew-Point, = 29.6
†† Do. Elastic Force of Vapour, = 164
†† Do. Weight of Vapour in a Cubic Foot of Air, =
†† Relative Humidity (Saturation = 100), = 82
RAIN fell on 16 Days; Amount in Inches, = 1.08

WIND.		SUMMARY.									
Direction.	N	NE	E	SE	S	SW	W	NW	Calm or Variable.	Mean Force.	Mean Velocity in miles per day
A.M.	-	2	-	4	5	9	4	4	-	1.14	
P.M.	1	1	-	4	5	7	7	3	-	1.22	
Mean.	1	1	-	4	5	8	5	4		1.18	

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Observations made and
Return verified by

(Signed)

Peter Harper

INSTRUCTIONS

ONE of the chief objects that the SCOTTISH METEOROLOGICAL SOCIETY proposed to itself when the Society was established in 1856, was to secure PERFECT UNIFORMITY in the system of observation pursued at all its Stations. Uniformity in the system of observation is absolutely necessary to justify the publication of Monthly Results from different observations, it being found that differences between the Returns from two Stations, so very considerable as to render them quite incomparable, may arise from dissimilarity in the position or shelter of instruments, different hours of observation, or even from the use of differently constructed instruments. It is therefore hoped, that those who kindly furnish Reports to the Society will, by a scrupulous attention to the following Directions, secure for their Monthly Returns an accuracy and value commensurate with the labour and pains involved in making them; and, for the Tables published by the Society, an entire comparableness among the several Returns, without which the Society's Reports must inevitably fail in achieving one of the main objects of Meteorological Observation.

The Council recommend that Observations be made precisely at 9 A.M. and 9 P.M. (Greenwich or Railway Time only), as specified in the following remarks, or at the top of the hour of observation. It is hoped that the utmost punctuality in the time of reading the instruments will be observed. Observers, in some few cases, may find this impossible; in such instances, they are specially requested to mark opposite every reading the time at which it was taken, if not at 9 A.M. or 9 P.M. Weather-Glasses and Aneroids, though well suited to indicate roughly variations of atmospheric pressure, are not to be used for Meteorological purposes. No Barometer should be used for adjustment or compensation which will secure that the height of the mercury in the tube is accurately measured from the fluctuating surface of the mercury in the cistern.

The Barometer in which the error arising from the fluctuating surface of the mercury in the cistern is entirely got rid of is FORTIN'S Barometer, the arrangement consisting in applying pressure by means of a screw to the bottom of the cistern, which is made of flexible leather, thus raising or depressing the surface till it just meets the ivory point which forms the zero point of the fixed scale.

The Barometer originally constructed by Mr. Adie of London, and usually called the Board of Trade Barometer, has the great convenience of requiring no adjustment of the cistern. Its scale-inches are not true inches, but so much shorter as to compensate the error that would otherwise arise from the fluctuations of the surface of mercury in the cistern. This is an excellent Barometer for ordinary Observers, inasmuch as it entirely eliminates the error of observation likely to arise in not a few cases in setting the instrument to the zero point of the fixed scale when the light is not good. To show the accuracy with which these Barometers are made, it may be stated, that one was compared, during a whole year, with the Society's Standard Barometer, particular care being given to make the comparison when atmospheric pressure was rising or falling very rapidly, with the result that none of the readings differed from those of the Standard more than 0.003 inch.

A modification of Fortin's Barometer is used at a number of the Society's Stations, by which the coincidence of the zero point with the surface of the mercury is indicated by a little ivory float, whose stem passes freely through the lid and case of the cistern. When the index-line on this little piston-rod is brought, by the adjusting screw, to form one straight line with those on its ivory frame, the surface of the mercury is then at the exact height from which the scale is graduated. In taking an observation, this preliminary setting must be made with scrupulous accuracy; as a slight error here will vitiate the readings from the vernier.

It is absolutely necessary that the Barometer which is to be used shall have been compared with a Standard Barometer.

The Barometer should be suspended in as good a light as can be secured, and to facilitate the reading, a piece of white paper may be put behind the tube. It must be hung truly perpendicular, and exposed to neither the sun's direct rays nor the heat of a fire, and must not be hung against a wall heated by a fire. The object being to secure that the whole instrument, including the brass fittings, the contained mercury, and the attached Thermometer, shall be, when read, at one uniform temperature, it is evident that the best position is that which is least liable to sudden changes of temperature.

In taking an Observation, the Attached Thermometer is first noted: the tube must then be gently tapped, and the cistern-adjustment carefully made. The eye, by raising and lowering it, must be brought into the plane of the back and front of the index—usually the lower edge of the vernier, which must be carefully adjusted so as to form exactly a tangent to the convex surface of the mercury in the tube. Observations must be taken quickly, so as to prevent heat from the observer's hands and person from affecting the mercury. The use of a lens will facilitate an accurate adjustment and reading of the Barometer. A mistake not unfrequently made by those beginning to observe, consisting in setting the edge of the vernier to the level of the clear surface of the mercury which is in direct contact with the glass tube, must be carefully avoided.

The errors most frequently made in reading the Barometer are errors of 1.000 inch, 0.500 inch, and 0.050 inch; that is to say, instead of 29.365 inches, either of the following is sometimes set down—viz. as 30.365 inches, 28.365 inches, or 29.815 inches. Experience having shown that even the very best Observers make these mistakes, particular attention is directed to the matter.

When a Barometer having adjustable surfaces has to be removed from its fastenings, the ivory peg must first be screwed so as to form a tight plug to the cistern, thus preventing the escape of the mercury. Then screw up the mercury not quite to the top of the tube, but to within a quarter of an inch of it, and take down the instrument; it should then be carried with the cistern uppermost. Before suspending the Barometer for use, it must be ascertained whether the space above the mercury in the tube is a complete vacuum; this is the case if, on inclining the instrument, a sharp tap is produced when the mercury strikes the top of the tube. If a dull tap is heard, there is air in the tube, which must be got rid of.

As Barometers are liable to be deranged by the introduction of air into their tubes, on removal from place to place, or in being roughly handled, it may be useful to Observers to know how the air may be expelled. First close up the cistern by screwing the ivory peg tight, so as to prevent the escape of mercury; then screw up the mercury to about half an inch from the top of the tube; and having slowly inverted the instrument, place the top of it on a yielding substance, such as the foot, and gently tap on the cistern with the palm of the hand, so as to induce the air to ascend through the column to the cistern, whence it may escape. Since there is the weight of two atmospheres—the pressure of the mercury in the Barometer, and the air outside—pressing on any air that may be inside the tube, it is usually a tedious operation to get it wholly expelled. After repeated trials, however, it is generally accomplished; and the clear metallic sound of the mercury, when gently struck against the top of the glass tube, will show when the whole of the air has been expelled. On hanging up the Barometer, care must be taken to screw down the mercury in the tube before unfastening the float of the cistern, for, if this be not attended to, the mercury will flow out, and the instrument be seriously damaged.

FOR TAKING METEOROLOGICAL OBSERVATIONS, WITH REMARKS ON THE USE OF INSTRUMENTS.

The Council of this Society recommend that the Self-Registering Thermometers, and the Dry and Wet Bulb Hygrometers, be kept in Stevenson's Long-barrelled Box, to which the Position of Thermometers.

Thermometers, painted white inside and outside, and secured by a screw to four stout posts, also painted white, that when fixed in the ground. The posts must be of such a length that when the Thermometers are hung in position the bulbs of the Minimum Thermometer, and of the Dry and Wet Bulb Thermometers, will be exactly at the same height of four feet above the ground; the Maximum Thermometer being hung immediately above the Minimum Thermometer. The thermometer box is to be placed over a plot of grass, and in a free open space to which the sun's rays have free access during as much of the day as surrounding conditions enable the Observer to secure. The Thermometers are suspended on cross-sticks in the centre of the box, and face the door, which should open to the north.

The Council regard the question of UNIFORMITY OF HEIGHT ABOVE GROUND, AND METHOD IN PROTECTING THE THERMOMETERS, as vital in every system of Meteorological Observation, since without it Observations made at different Stations are incomparable, thus rendering it impossible to compare the climates of places with each other as regards their most important features.

Professor Phillips, and Negretti and Zambra's Minimum Thermometer, self-registering meters, and Negretti and Zambra's Minimum Thermometer, are recommended. It is recommended that these Minimum Thermometers be graduated on the glass-tem. column of spirit breaking, and part of the spirit distilling by high temperature and lodging at the top of the tube. This dangerous is of occasional occurrence with protected Thermometers, but of frequent occurrence with exposed Thermometers. Hence a systematic examination of Minimum Thermometers ought to be a regular part of the work carried on by each Observer.

Fortunately, Spirit Thermometers may be easily set right by any one, when the column of spirit changes to separate. Let the Thermometer be taken in the hand by the end farthest from the bulb, raised above the head, and then forcibly swung down towards the feet; the object being, on the principle of centrifugal force, to send down the detached portion of spirit till it unites with the column. A few throws, or swinging strokes, will generally be sufficient for the purpose; after which the Thermometer should be placed in a slanting position, to allow the rest of the spirit still adhering to the sides of the tube to drain down to the bulb. But another method must be adopted, if the portion of spirit in the top of the tube be small. Heat should be applied slowly and cautiously to the top end of the tube where the detached portion of spirit is, which, being turned into vapor by the heat, will condense on the surface of the unbroken column of spirit. Care must be taken that the heat is not applied too quickly; for, if this be done, the tube will break and the instrument be destroyed. The best way to apply the requisite amount of heat is by bringing the end of the tube slowly down towards a mantle flame from a gas-burner, or, if gas be not at hand, a piece of heated metal will serve instead.

The bulbs of the Thermometers for registering the greatest heat during night, have a black coating, which may easily be made, or mended, by the application of a mixture of lampblack and printer's ink. They are placed in shallow blackened boxes, whose sides protect the bulbs from the wind. The Maximum should be freely exposed to the sun, and the Minimum should rest on open supports a few inches from the surface of the grass in an open situation. Snow must not be allowed to cover either of these Thermometers; nor the sun's heat to affect the Minimum Thermometer by distillation. Black-bulbs enclosed in glass jackets may also be used, being indeed preferable to the above. It must, however, be added, that the whole subject of the observation of Solar and Terrestrial Radiation is not yet in a sufficiently advanced state to warrant the exclusive recommendation of any one of these methods.

The Hygrometer in use at the Society's Stations consists of two Dry and Wet Bulb Thermometers usually, but not necessarily, mounted on one frame. As apparently slight deviations from the Hygrometrical Observations, Observers are specially requested to attend to the following conditions:—The bulbs must hang down by at least an inch free from the scales and frame to which they are attached; the frame must be such as will bring the tubes forward by an inch from any board on which it may be suspended; the water must be covered, and altogether placed to the side, and a little below the level of the wet bulb, but in no case under the bulb; the muslin must be of medium fineness, and fastened at the neck of the bulb by the cotton, which also supplies it with water. It must be seen to by the Observer that the muslin is always clean and moist, and the water pure. In frosty weather, observation is a matter of much delicacy, and must be made with great care. The bulb must be moistened by immersion from 15 to 30 minutes before the hour of observation. From the film of ice thus formed evaporation will proceed as from the moist cloth in ordinary circumstances.

In reading the Thermometer great care must be taken to bring the eye exactly opposite the tip of the index or column of mercury. The reading ought to be taken to tenths of a degree, and noted in decimals. Thus the Thermometer will be read—39.4, 40.0, or 40.1; or again, 40.4, 40.5, 40.6, according as it indicates a little under, an exact coincidence with, or a little over 40, or 40.3, respectively. So also 40.1, or 40.2, more or less, must be registered 40.2, or 40.3, and 40.4, or 40.5, respectively. In reading Rutherford's Minimum Thermometer, the indication of that end of the index which is next the surface of the spirit is alone noted. On opening the Thermometer Box, the Dry and Wet Bulb Thermometers are to be first, and rapidly, read, inasmuch as they are readily affected by heat from the person of the Observer.

The Hygrometer is read at 9 A.M. and 9 P.M. The Self-Registering Thermometers are read at 9 P.M. only, as, in the hour of observing, the greatest and least degrees of temperature in the 24 hours preceding. It is not a matter of indifference when the Self-Registering Thermometers are read, since, in winter at least, the extremes may occur at any hour; and it is necessary to refer their occurrence to their proper meteorological day. In the Society's schedules, the indications registered on the 3d are those of a series of phenomena commencing at 9 P.M. on the 2d, and extending till 9 P.M. on the 3d.

No instrument ought to be used for Meteorological purposes till it has been carefully tested by comparison with the verification of a standard Thermometer. When such Thermometers are not graduated on the stem, but merely on an attached scale, undergo repairs, they are very liable to be moved from their position on the Scale, and ought never afterwards to be used without being re-tested. The Self-Registering, especially the Minimum Thermometers, ought frequently to be compared with the dry bulb of the Hygrometer. The freezing-point of each Thermometer, marked by a scratch on the tube, ought to be tested once a year, in snow or melting ice.

In selecting instruments, the following points require attention:—The divisions of the vernier of Barometers in reference to their scales, and the perfect freedom of the Barometer from air; the indifference when the Self-Registering Thermometers are read, since, in winter at least, the extremes may occur at any hour; and it is necessary to refer their occurrence to their proper meteorological day. In the Society's schedules, the indications registered on the 3d are those of a series of phenomena commencing at 9 P.M. on the 2d, and extending till 9 P.M. on the 3d.

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correct numbering of the scale of every instrument; the rejection of Thermometers the frameworks of which are not likely to stand exposure to the weather, as shown in the past by repeated and annoying breakages of Thermometers of similar construction; and, as regards Maximum Thermometers, either Negretti and Zambra's, or Phillips's, whether they will act at the highest temperatures they may be required to register. By the laws of the Society, Members and Observers have a right to have their instruments compared by the Secretary, and to advise with him regarding the purchase of instruments. Very great care should be bestowed on the Observations of the Wind.

Wind. The accuracy of which, both as regards Direction and Force, is so essential towards the right discussion of many of the more important problems of the science. A Wind-Vane ought to be elevated at least 12 feet above surrounding objects. When it oscillates inausurably, the mean direction should be taken. In all cases, but especially when the Vane is stationary, and when the wind is feeble, reference may be made to the direction of smoke, etc., in well-exposed situations. Careful observations are recommended to be made on the changes in the direction of the wind; and during storms, extra observations at every hour of Greenwich time. Such a system of simultaneous observation, pursued at different Stations, is likely to give highly valuable and important results, particularly in connection with the system of thickly-planted Stations, over a limited district round Edinburgh called STORM STATIONS, in a course of being established by the Society for the systematic investigation of the relation of the force of the wind to BAROMETRIC GRADIENTS, and other points connected with storms.

The Council would recommend the Hemispherical Cup Anemometer, and other points connected with storms. As regards amount of Wind that passes it per day; from which also the mean Velocity of the Wind at the time of observation may be ascertained. For indicating the Force of the Wind at any particular hour of observation, the Pressure Anemometers recently brought under the notice of the Society by Mr. T. Stevenson, the Honorary Secretary, and Mr. R. Ballingall, the Society's Observer at Edinburgh, are recommended as likely to secure uniformity in making observations on the Force of the Wind.

Many causes conspire to produce anomalies in Rain Returns, arising partly from the difficulty of obtaining a perfectly unobstructed situation for observation, and partly from the defective nature of the instruments used. The Rain Gauge should not be placed on a slope or terrace, but on a level piece of ground in as open a situation as the Observer can secure for it. As it is often difficult to obtain a position as free and unobstructed by surrounding objects as is desirable, care should be taken to place it at some distance from shrubs, trees, buildings, or other obstructions, at least as many feet from their base as they are in height. The more important directions, towards which it is most desirable to have a free exposure, are, in the order of their importance, S.W., N.E., S.E., S., and W. The rain of the gauge must be perfectly level, and fixed so that it will remain level in all weathers, and be at a height of one foot above ground, over grass. In such gauges as Fleming's, which are furnished with a measuring-rod attached to a float, the rod ought to be fixed down, and the float rise to its height only at the time the instrument is read, it being found that a stem projecting above the rim of the gauge seriously interferes with the proper measurement of the Rain-fall. When a measuring-glass is used, care should be taken to hold it quite perpendicular. The Rain Gauge ought to be read daily at 9 A.M., and the reading entered in the Returns of the previous day. If the Gauge is read once a month, the reading is to be made on the first of the month, and the amount entered for the previous month.

Snow-falls, for convenience, be registered in the rain columns, under the following conditions:—When a Snow-fall occurs, it should be noted in the Returns, and the letter S affixed to the depth of water received in Gauge. The depth of the snow must be measured in some open place where no drift is observed, and registered in addition to, and as a check upon, the indications of the Rain Gauge. For wind, rain, and snow, as is entered in every column, the Observer cannot be too careful to register observations only; and nothing that partakes of the nature of deduction or inference.

Convenient abbreviations for the nomenclature of Clouds will be found on the other side. The amount of Cloud ought to be estimated from the greater or less observation of the sky overhead (i.e. within 30° or 50° of the zenith). The strata of Clouds that appear near the horizon are viewed obliquely; and, thus, being unable to judge of their amount, we ought not to take them into account in the Clouds column, though their appearance and changes may be noted among the Remarks. The amount of Cloud is entered from a scale of 0 to 10; thus, when the sky overhead is free from Clouds it is entered 0; when half-covered by Clouds, 5, wholly covered, 10, and so on.

Observations of the Clouds are made at 9 A.M. and at sunset, as illustrating the condition and currents of the upper and lower regions of the atmosphere. The entries in the scale are to be made in the following manner:—Thus, in the column Velocity and Direction, 9, S. W. will indicate that the upper strata of Clouds travel with 9, W. will indicate that the lower regions from W., with one-third the speed of the former. Again, in the second Cloud column, an entry of $\frac{1}{2}$ will indicate that the higher regions are covered to the amount of 4-tenths with stratus Clouds; and that the sky is further obscured to the extent of 2-tenths by lower Clouds of the cumulo stratus kind.

Remarks on peculiar Clouds, accompanied with drawings, will assist materially in the development of a more exact nomenclature of Clouds, as well as throw light on the electrical, and other of the more obscure phenomena of Meteorology. The approximate number of Hours in which objects in the sun's rays cast shadows, should be entered in the proper column.

As the germination and growth of crops and plants generally depend greatly on the temperature of the soil,—its underground amount and consistency,—the Council recommend that Observations in this interesting department be made at 9 A.M., by Thermometers permanently fixed in the soil, their bulbs being sunk to depths of 3, 12, and 25 inches, and the stems above ground protected from the sun's rays, and fitted with sloping tin collars, to prevent rain-water being conveyed to the bulbs by the stems or wooden frames.

A knowledge of the Temperature of the Sea is not only in itself, but in its relations to that of our island, a most important branch of Meteorology. The Council therefore recommend that the Temperature of the Sea be carefully taken by a properly constructed apparatus, from boats, or, if this be impracticable, from the ends of piers and rocks round the coast, where it is not influenced by that of river water, and as little influenced as possible by currents sweeping along the coast, and thus acquiring the temperature of the land, either greatly heated by the sun or cooled by nocturnal radiation. At or near the time of high

water, in cases where the observations cannot be taken daily, the observation may be made on the 5th, 15th, and 25th of each month. When convenient, extra Sea Observations might be taken on the 1st and 3rd of each month, and greater depths not only the Temperature of the Air, but the daily Maxima and Minima by Thermometers continuously submerged, be instituted at points along the coast, by the method proposed by Mr. T. Stevenson, and already commenced at Perth and Wemyss.

The Temperature of the water at the bottom of Wells, or Temperature of Water. When practicable, to be taken, both the depth of the Well and of the water being noted. Mention what Paper is used, Schönbien's or Moffat's, etc. The Paper is affixed by a pin to a board in the Thermometer Box, and the indications registered at 9 A.M. and 9 P.M. It is desired that these indications be registered in connection with the force and direction of the wind at the time of observation, in the following manner:—thus 3—S—, as an Ozone entry in the schedule will indicate that the Ozone paper is tinted as 3 on the scale, that the wind is from the N.W., and that its force on the scale 0—5 is 4, or blowing fresh.

Too much importance cannot be attached to the electric condition of the atmosphere in connection with terrestrial magnetism, barometrical, thermometrical, and atmospheric meteorological phenomena generally. A proper Electrometer is, in truth, necessary to every complete meteorological observatory.

The Remarks column is unavoidably too narrow. Some of the most valuable Observations that can be taken are those for which no rules can be given nor hours assigned. The use of contractions ought, therefore, to be taken every advantage of, and a list of such as are in general use is given at the foot of the column. Besides special and extraordinary Observations, great prominence ought to be given in this column to Prevalent Diseases, differences in character, colour, velocity, and direction between the Lower and Upper Strata of clouds, the Colour of the Aurora Borealis, remarkable depressions, elevations, and fluctuations of the Barometer, Thunder-Storms, and remarkable falls of Snow, Hail, or Rain, the Hour of Storms of Wind commencing, attaining their maximum, and ending, as well as such Notes on Storms as have been hinted at above. When lofty hills are in the vicinity of a Station, the Heights of Clouds and of the Snow-line in winter should be recorded. By the use of abbreviations, the state of the weather at 9 A.M. and 9 P.M. should be registered, either in two columns, otherwise uncoupled, or ruled off for the purpose, from the column of Remarks.

Observations in connection with the Periodic Return of the observations in Seasons, possess not only great scientific value, but are of considerable importance in connection with the Periodic Re-Agriculture, Horticulture, and Natural History. The turn of the Council would direct the special attention of Observers to the registration of such phenomena, so that the published Summaries may fairly represent the whole of Scotland. Observations ought to be confined to individual trees and shrubs; to particular species of birds, and, in the case of crops, to specified sorts reared from year to year on a selected piece of ground or farm. The Annual Table, published yearly in the Society's Journal, will indicate the species of plants and animals to which special attention is more particularly directed.

The Council recommend Observers, before purchasing new instruments, and in repairing old ones, to communicate with the Meteorological Secretary, in order that every instrument may be examined and improved before being used; and they consider it necessary that he should have full power to reject any instrument which, on being presented for comparison, does not afford him satisfaction.

(By Order) A. B. EDINBURGH.

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(By Order) A. B. EDINBURGH.

FOREST TREES		MIGRATORY BIRDS		FRUITS		SHRUBS, ETC.	
First in Blossom.	In Flower.	First in Blossom.	In Flower.	First in Blossom.	In Flower.	First in Blossom.	In Flower.
Alder		Chukar		Apple		Barberry	
Aspen		Cuckoo		Black Currant		Bourtree or Elder	
Beech		Curlew		Cherry		Broom	
Birch		House-Swallow		Gooseberry		Hazel	
Blow		Lapwing		Plum		Holly	
Elm		Plover		Peach		Laburnum	
Lime		Sand-Martin		Strawberry		Mountain Ash or Rowan	
Oak		Starling				Rhododendron Ponticum	
Sycamore or Plane		Swan				Whin	

CROPS		MIGRATORY BIRDS		FRUITS		SHRUBS, ETC.	
First Cut	In Bar or Raised	First in Blossom.	In Flower.	First in Blossom.	In Flower.	First in Blossom.	In Flower.
Barley		Chukar		Apple		Barberry	
Bare or Bigg		Cuckoo		Black Currant		Bourtree or Elder	
Oats		Curlew		Cherry		Broom	
Peas		House-Swallow		Gooseberry		Hazel	
Potatoes		Lapwing		Plum		Holly	
Turnips		Plover		Peach		Laburnum	
Rye Grass		Sand-Martin		Strawberry		Mountain Ash or Rowan	

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

To the SECRETARY,

Scottish Meteorological Society,

122 George Street,

EDINBURGH.

BOOK POST.

SCOTTISH METEOROLOGICAL SOCIETY.

Observations taken at Dunfermline, Fife, County of Fife, in Lat. 56° 24' N, Long. 2° 47' W, Distance from Sea 2 miles.

Height of Cistern of the Barometer above Mean Sea-Level 44 feet, above Ground 4 feet.

During the MONTH of March 1902.

The Hours of Observation are of Greenwich Time.

ELECTRICITY.	Days of Month.	BAROMETER.				SELF-REGISTERING THERMOMETERS. Read Daily, at 9 P.M.				HYGROMETER.				Rain.	WIND.				CLOUDS.				SUNSHINE. Hours.	THERMOMETERS under Ground.			SEA.	OZONE.	GENERAL REMARKS. As to occurrence of Thunder, Lightning, Storms, Hail, Meteors, Remarkable Depression or Elevation of Barometer, Prevalent Diseases, etc. <i>Mention the hour at which Storms, including Thunder and Lightning, began and ended.</i>	Days of Month.						
		9 h. A.M.		9 h. P.M.		Protected in Shade, 4 feet above Ground.		Exposed Black Bulbs.		9 h. A.M.		9 h. P.M.			9 h. A.M.		9 h. P.M.		9 A.M.		P.M.			9 h. A.M.												
		Barometer.	Attached Thermometer.	Barometer.	Attached Thermometer.	Max.	Min.	Max. in Sun's rays.	Min. on Grass.	Dry bulb.	Wet bulb.	Dry bulb.	Wet bulb.		No. of hours in which it fell.	Amount in inches.	Direction.	Force.	Direction.	Force.	Readings of the H. Cup Anemometer.	9 h. A.M.		Velocity (0-9) and Species.	Amount (0-10), and Species.	Velocity (0-6) and Direction.					Amount (0-10), and Species.	No.	No.	No.		
		* No.	inches.	°	inches.	°	°	°	°	°	°	°	°		°	°	°	°	°	°	°	°		°	°	°					°	°	°	°	°	°
		No.	inches.	°	inches.	°	°	°	°	°	°	°	°		°	°	°	°	°	°	°	°		°	°	°					°	°	°	°	°	°
	1	29.530	42	29.650	43	44.0	34.0			37.0	36.5	39.0	38.0	0.00	SW	0.5	SW	1												dense fog clearing up 11 am	1					
	2	29.700	45	29.800	47	50.0	35.0			40.6	40.0	41.0	39.0	0.00	SW	0.5	SW	0.5												rain fine all day	2					
	3	29.800	43	29.800	44	47.0	32.0			38.8	37.8	37.0	36.5	0.05	SW	1	S	1												fine to 3 pm then showers	3					
	4	29.810	47	29.900	48	50.0	38.0			47.2	45.4	45.2	43.2	0.01	SW	1.5	SW	1												fine slight rain from P.M.	4					
	5	29.850	46	29.910	48	54.2	41.0			43.0	41.0	46.0	45.0	0.04	SW	2	W	1												fine all day, very mild	5					
	6	29.855	44	29.800	49	53.5	37.0			43.5	42.6	47.5	46.6	0.02	W	0.5	SW	1												some rain, fine after 9 am	6					
	7	29.900	44	29.950	49	47.0	42.0			43.6	42.5	46.0	39.6	0.03	W	1	S	1												fine all day	7					
	8	29.680	46	29.360	49	49.8	39.0			42.2	41.5	46.0	40.0	0.13	SW	1	W	1.5												fine clear showers, shower P.M.	8					
	9	29.610	48	29.855	47	43.5	38.6			40.0	38.0	36.0	35.0	0.18	W	1	SW	1												* sleet showers, afternoon	9					
	10	29.850	45	30.000	47	52.4	35.0			40.6	40.0	44.0	42.0	0.00	S	1	W	1												fine, damp fog, then fine	10					
	11	30.050	44	30.075	47	45.4	32.0			37.0	35.4	39.0	37.0	0.00	W	1	SW	1												fine all day	11					
	12	29.950	45	29.755	44	43.0	35.0			41.0	39.8	43.0	41.8	0.01	S	2	S	2												dull all day	12					
	13	29.710	45	29.750	44	50.4	33.0			42.4	40.2	41.0	38.5	0.00	S	2	SW	1.5												fine & dry all day	13					
	14	29.715	45	29.580	46	46.0	36.0			39.8	38.2	42.0	40.5	0.06	SW	1	SW	1												fine dull all day	14					
	15	29.500	46	29.775	46	51.0	36.5			42.6	39.0	42.2	39.8	0.06	W	1	W	2												fine, stormy showers after 3 pm	15					
	16	30.050	46	30.100	48	57.0	38.4			42.0	39.0	41.2	38.8	0.07	W	1	SW	1												fine & fine	16					
	17	29.950	46	29.900	52	51.4	39.8			46.4	45.4	51.5	47.5	0.00	SW	1	W	1												showers, fine till after 8 pm	17					
	18	29.680	50	29.660	30	55.0	36.4			49.0	46.8	43.5	39.2	0.00	SW	2	SW	1												fine & fine all day	18					
	19	29.600	48	28.950	50	47.4	33.0			42.6	39.0	44.6	41.8	0.01	SW	2	SW	3												do do	19					
	20	29.000	47	28.890	47	48.6	36.5			41.8	37.0	34.0	31.0	0.00	SW	2	W	1												do do	20					
	21	28.675	46	28.955	44	48.0	28.0			38.8	35.5	38.0	34.8	0.17	SW	1	W	1												* fine white frost, sleet 1 pm	21					
	22	28.975	45	29.120	43	48.0	33.0			40.2	37.8	35.0	34.0	0.22	SW	1	SW	1												* fine, sleet showers	22					
	23	29.255	45	29.425	41	47.0	33.5			37.0	36.0	35.6	34.0	0.00	SW	1	W	1												dull frequent showers	23					
	24	29.400	42	29.300	46	47.0	28.0			37.0	34.0	37.4	36.0	0.00	W	1	S	1												fine all day dull P.M.	24					
	25	29.500	43	29.650	42	46.0	31.0			36.2	33.4	34.2	31.5	0.00	W	1	W	1												fine cold	25					
	26	29.675	43	29.700	42	48.0	31.0			36.0	31.5	31.0	29.5	0.03	W	1.5	SW	1												fine & fine	26					
	27	29.630	43	29.750	46	45.0	28.5			37.4	36.6	34.0	32.0	0.01	SW	1	SW	1												some rain, clear P.M.	27					
	28	29.800	44	29.490	47	50.0	36.0			36.8	33.2	41.6	38.0	0.06	SW	1	W	1												fine & fine	28					
	29	29.475	45	29.750	41	44.2	37.2			40.2	39.0	39.0	34.0	0.14	S	1	W	2												* rain to sleet.	29					
	30	29.840	41	29.855	42	44.5	32.0			36.3	31.6	33.0	31.5	0.00	W	2	W	1												fine & fine	30					
	31	29.610	45	29.500	48	52.0	33.0			42.4	39.8	43.5	40.0	0.00	SW	2	SW	1												fine & fine	31					
Sums.		14103		29113	15135					1510	1610	135	158	135																	NOTATION USED IN GENERAL REMARKS.					
Means.		29.640		29.653	46.0					40.6	38.5	40.3	38.0																		a. denotes aurora.					
+ Total Corrections for Instrumental Errors.		- 010		- 010																											ci. denotes cirrus.					
+ Corrections for Diurnal Range.																															ci-cu. denotes cirro-cumulus.					
"Corrected Means."		29.630		29.643	46.0																										ci-s. denotes cirro-stratus.					
No. of Column.		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	ci-cu-s. denotes cirro-cumulo-stratus.				

BAROMETER, "corrected Mean" at 9 A.M., minus the Correction $\frac{1}{100}$ for Temp. (Col. 2), = 29.586
 "Corrected Mean" of Barometer at 9 P.M., minus the Correction $\frac{1}{100}$ for Temp. (Col. 4), = 29.697
 Mean at Station, corrected, and at 32°, = 29.598
 Correction for height, feet above Mean Sea-level, = 50
 Mean, reduced to 32°, and Sea-level, = 29.646
 Highest Reading, corrected for Index error, on the 16th, = 30.100
 Lowest Do. Do., on the 21st, = 28.875
 Difference, or Monthly Range, = 1.225

S.-R. THERMOMETER, (in shade, etc.), Highest in Month, (corrected for Index Errors), on the 18th, = 55.0
 Lowest in Month, corrected for Index errors, on the 21st, = 28.0
 Difference, or Monthly Range, = 27.0
 "Corrected Mean" of all the Highest, (Col. 5), = 48.3
 "Corrected Mean" of all the Lowest, (Col. 6), = 34.8
 Difference, or Mean Daily Range, = 13.5
 ** Calculated Mean Temperature of Month, = 41.5
 S.-R. THERMOMETER, Black Bulb in Sun, Highest, (corrected for Index Errors), on the 18th, = 55.0
 "Corrected Mean," (Col. 7), of Black Bulb, Max. in Sun, = 48.3
 Lowest at Night, Black Bulb (corrected for Index errors), on the 21st, = 28.0
 "Corrected Mean," (Col. 8), of Black Bulb, Min. on grass, = 34.8
 Difference of above means or range ("exposed"), = 13.5

HYGROMETER, Mean (corrected) A.M. and P.M. Reading of Dry Bulb, (Cols. 9 and 11), = 40.5
 Mean (corrected) A.M. and P.M. Reading of Wet Bulb, (Cols. 10 and 12), = 38.2
 Computed Temperature of Dew-Point, = 35.3
 Do. Elastic Force of Vapour, = 2.06
 Do. Weight of Vapour in a Cubic Foot of Air, = 82
 Relative Humidity (Saturation = 100), = 82
 RAIN fell on 15 Days; Amount in Inches, = 1.35

WIND.		SUMMARY.									
Direction.		N	NE	E	SE	S	SW	W	NW	Calm or Variable.	Mean Force.
A.M.		2	-	1		3	17	3	4	-	1.24
P.M.		3		1	1	3	14	7	2	-	1.18
Mean.		3	0	1	1	3	15	5	3	0	1.11

Observations made and
Return verified by

(Signed) Peter Harper

SCOTTISH METEOROLOGICAL SOCIETY.

Observations taken at Dutton Park Sherburn, County of Sherburn, in Lat. 53.9 N, Long. 2.6 W, Distance from Sea 2 miles.

Height of Cistern of the Barometer above Mean Sea-Level 44 feet, above Ground 4 feet.

During the MONTH of April 1902.

The Hours of Observation are of Greenwich Time.

[illegible]

BAROMETER, "corrected Mean" at 9 A.M., <i>minus</i> the Correction $\ddagger\ddagger$	=	29.862
for Temp. (Col. 2), =	5.0	
"Corrected Mean" of Barometer at 9 P.M., <i>minus</i> the Correction $\ddagger\ddagger$	=	29.877
for Temp. (Col. 4), =	5.1	
Mean at Station, corrected, and at 32°,.....	=	29.870
Correction for height, feet above Mean Sea-level,.....	=	5.0
Mean, reduced to 32°, and Sea-level,	=	1920
Highest Reading, corrected for Index error, on the 27 th ,.....	=	30 375
Lowest Do. Do., on the 1 st th,.....	=	29 254
Difference, or Monthly Range,	=	1.121

S.-R. THERMOMETER, (in shade, etc.), Highest in Month, (corrected for Index Errors), on the <u>23</u> th.....	=	<u>63.0</u>
Lowest in Month, corrected for Index errors, on the <u>4</u> th, <u>7</u>	=	<u>28.0</u>
Difference, or Monthly Range,	=	<u>35.0</u>
"Corrected Mean " of all the Highest, (Col. 5),	=	<u>54.6</u>
"Corrected Mean " of all the Lowest, (Col. 6),.....	=	<u>36.2</u>
Difference, or Mean Daily Range,	=	<u>18.4</u>
** Calculated Mean Temperature of Month,	=	<u>43.9</u>
 S.-R. THERMOMETER, Black Bulb in Sun, Highest, (corrected for Index Errors), on the th.....		
"Corrected Mean, " (Col. 7), of Black Bulb, Max. in Sun,	=	
Lowest at Night, Black Bulb (corrected for Index errors), on the th, =		
"Corrected Mean, " (Col. 8), of Black Bulb, Min. on grass,.....	=	
Difference of above means or range ("exposed"),	=	

HYGROMETER, Mean (corrected) A.M. and P.M. Reading of Dry Bulb , (Cols. 9 and 11),	=	43.5
Mean (corrected) A.M. and P.M. Reading of Wet Bulb , (Cols. 10 and 12),	=	41.0
Computed Temperature of Dew-Point ,	=	38.0
Do. Elastic Force of Vapour ,	=	.229
Do. Weight of Vapour in a Cubic Foot of Air ,	=	
Relative Humidity (Saturation = 100),	=	80
RAIN fell on ¹⁴ Days; Amount in Inches,	=	2.69

WIND.		SUMMARY.									
Direction.	N	NE	E	SE	S	SW	W	NW	Calm or Variable.	Mean Force.	Mean Velocity in miles per day
A.M.	1	1	2	2	8	7	6	3	—	1.35	
P.M.	3	1	3	6	9	2	3	4	—	1.28	
Mean.	2	1	3	3	8	5	4	4	0	1.32	

1.74

Observations made and
Return verified by

(Signed).

Peter Harper

SCOTTISH METEOROLOGICAL SOCIETY.

Observations taken at Duthie Park Aberdeen County of Aberdeen, in Lat. 57° 9' N, Long. 2° 16' W, Distance from Sea 2 miles.

Height of Cistern of the Barometer above Mean Sea-Level 44 feet, above Ground 4 feet.

During the MONTH of May 1902.

The Hours of Observation are of Greenwich Time.

[illegible]

BAROMETER, "corrected Mean" at 9 A.M., <i>minus</i> the Correction \ddagger		=	<u>860</u>
for Temp. (Col. 2), =48.....			
"Corrected Mean" of Barometer at 9 P.M., <i>minus</i> the Correction \ddagger		=	<u>890</u>
for Temp. (Col. 4), =48.....			
Mean at Station, corrected, and at 32",		=	<u>875</u>
Correction for height, feet above Mean Sea-level,.....		=	<u>49</u>
Mean, reduced to 32", and Sea-level,		=	<u>924</u>
Highest Reading, corrected for Index error, on the 8 th ,.....		=	30.355
Lowest	Do. Do., on the 17 th ,.....	=	29 200
Difference, or Monthly Range,		=	1.155

S.-R. THERMOMETER, (in shade, etc.), Highest in Month, (corrected for Index Errors), on the 23rdth, = 78.0

Lowest in Month, corrected for Index errors, on the 2ndth, = 33.5

Difference, or **Monthly Range,** = 44.5

"Corrected Mean" of all the Highest, (Col. 5), = 53.2

"Corrected Mean" of all the Lowest, (Col. 6), = 39.4

Difference, or **Mean Daily Range,** = 13.8

**** Calculated Mean Temperature of Month,** = 46.3

S.-R. THERMOMETER, Black Bulb in Sun, Highest, (corrected for Index Errors), on the th, =

"Corrected Mean," (Col. 7), of Black Bulb, Max. in Sun, =

Lowest at Night, Black Bulb (corrected for Index errors), on the th, =

"Corrected Mean," (Col. 8), of Black Bulb, Min. on grass, =

Difference of above means or range ("exposed"),

HYGROMETER, Mean (corrected) A.M. and P.M. Reading of Dry Bulb, (Cols. 9 and 11), = 45.6

Mean (corrected) A.M. and P.M. Reading of Wet Bulb, (Cols. 10 and 12), = 43.4

†† Computed Temperature of Dew-Point, = 40.7

†† Do. Elastic Force of Vapour, = .257

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

†† Relative Humidity (Saturation = 100), = 85

RAIN fell on 23 Days; Amount in Inches, = 3.89

WIND.		SUMMARY.									
Direction.	N	NE	E	SE	S	SW	W	NW	Calm or Variable.	Mean Force.	Mean Velocity in miles per day
A.M.	3	4	0	2	2	4	2	14	0		
P.M.	6	6	0	3	2	3	5	6	0		
Mean.	5	5	0	2	2	3	4	10	0	162	2

2.62

Observations made and
Return verified by

(Signed) Peter Harper

SCOTTISH METEOROLOGICAL SOCIETY.

Observations taken at Duthie Park Aberdeen, County of Aberdeen, in Lat. 57° 9' N, Long. 2° 16' W, Distance from Sea 2 miles.Height of Cistern of the Barometer above Mean Sea-Level 44 feet, above Ground 4 feet.During the MONTH of June 1902.

The Hours of Observation are of Greenwich Time.

ELECTRICITY.	Days of Month.	BAROMETER.				SELF-REGISTERING THERMOMETERS. Read Daily, at 9 P.M.				HYGROMETER.				Rain.		WIND.				CLOUDS.				THERMOMETERS under Ground.			SEA.	OZONE.	GENERAL REMARKS.		Days of Month.																																																																																																																																																																																																																																																																																																																																																																																																																																																																									
		9 h. A.M.		9 h. P.M.		Protected in Shade, 4 feet above Ground.		Exposed Black Bulbs. Sun's rays Grass.		9 h. A.M.		9 h. P.M.		No. of hours in which it fell.	Amount in inches.	9 h. A.M.		9 h. P.M.		Readings of the H. Cup Anemometer. No. _____	9 A.M.		P.M.		9 h. A.M.				As to occurrence of Thunder, Lightning, Storms, Hail, Meteors, Remarkable Depression or Elevation of Barometer, Prevalent Diseases, etc.																																																																																																																																																																																																																																																																																																																																																																																																																																																																											
		Barometer. * No. _____	Attached Thermometer No. _____	Barometer. No. _____	Attached Thermometer No. _____	Max. No. _____	Min. No. _____	Max. in Sun's rays No. _____	Min. on Grass. No. _____	Dry bulb. No. _____	Wet bulb. No. _____	Dry bulb. No. _____	Wet bulb. No. _____			Direction.	Force.	Direction.	Force.		Velocity (0-6) and Direction.	Amount (0-10), and Species.	Velocity (0-6) and Direction.	Amount (0-10), and Species.	No. _____	No. _____			No. _____	0-10.																																																																																																																																																																																																																																																																																																																																																																																																																																																																										
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BAROMETER, "corrected Mean" at 9 A.M., minus the Correction $\frac{1}{10}$ for Temp. (Col. 2), = 29.907
"Corrected Mean" of Barometer at 9 P.M., minus the Correction $\frac{1}{10}$ for Temp. (Col. 4), = 29.900
Mean at Station, corrected, and at 32°, = 29.903
Correction for height, feet above Mean Sea-level, = 50
Mean, reduced to 32°, and Sea-level, = 29.953
Highest Reading, corrected for Index error, on the 7th, = 30.345
Lowest Do. Do., on the 7th, = 29.550
Difference, or Monthly Range, = 0.795

S.-R. THERMOMETER, (in shade, etc.), Highest in Month, (corrected for Index Errors), on the 7th, = 74.0
Lowest in Month, corrected for Index errors, on the 9th, = 39.0
Difference, or Monthly Range, = 35.0
"Corrected Mean" of all the Highest, (Col. 5), = 58.7
"Corrected Mean" of all the Lowest, (Col. 6), = 45.9
Difference, or Mean Daily Range, = 12.8
** Calculated Mean Temperature of Month, = 52.3
S.-R. THERMOMETER, Black Bulb in Sun, Highest, (corrected for Index Errors), on the 7th, = 74.0
"Corrected Mean," (Col. 7), of Black Bulb, Max. in Sun, = 74.0
Lowest at Night, Black Bulb (corrected for Index errors), on the 7th, = 39.0
"Corrected Mean," (Col. 8), of Black Bulb, Min. on grass, = 39.0
Difference of above means or range ("exposed"), = 35.0

HYGROMETER, Mean (corrected) A.M. and P.M. Reading of Dry Bulb, (Cols. 9 and 11), = 51.3
Mean (corrected) A.M. and P.M. Reading of Wet Bulb, (Cols. 10 and 12), = 49.1
Computed Temperature of Dew-Point, = 46.8
Do. Elastic Force of Vapour, = 32.2
Do. Weight of Vapour in a Cubic Foot of Air, = 8.5
Relative Humidity (Saturation = 100), = 85
RAIN fell on 16 Days; Amount in Inches, = 1.59

WIND.		SUMMARY.				
Direction.		N	NE	E	SE	S
A.M.		3	8	5	2	3
P.M.		4	7	6	5	3
Mean.		4	7	5	4	3

Observations made and
Return verified by(Signed) Peter Harper

INSTRUCTIONS

ONE of the chief objects that the SCOTTISH METEOROLOGICAL SOCIETY proposed to itself when the Society was established in 1856, was to secure PERFECT UNIFORMITY in the system of observation pursued at all its Stations. Uniformity in the observations is absolutely necessary to justify the publication of Monthly Results from different observations, it being found that differences between the Returns from two Stations, so very considerable as to render them quite incomparable, may arise from dissimilarity in the position or shelter of instruments, different hours of observation, or even from the use of differently constructed instruments. It is therefore hoped, that those who kindly furnish Reports to the Society will, by a scrupulous attention to the following Directions, secure for their Monthly Returns an accuracy and value commensurate with the labour and pains involved in making them; and, for the Tables published by the Society, an entire comparableness among the several Returns, without which the Society's Reports must inevitably fail in achieving one of the main objects of Meteorological Observation.

The Council recommend that Observations be made precisely at 9 A.M. and 9 P.M. (Greenwich or Railway Time only), as specified in the following remarks, or at the top of the column of the Schedule. It is hoped that the utmost punctuality in the time of reading the instruments will be observed. Observers, in some few cases, may find this impossible; in such instances, they are specially requested to mark opposite every reading the time at which it was taken, if not at 9 A.M. or 9 P.M. Weather-Glasses and Aneroids, though well suited to indicate roughly variations of atmospheric pressure, are not fitted for scientific purposes. No Barometer should be used for Meteorological observation that is not supplied with some means of adjustment or compensation which will secure that the height of the mercury in the tube is accurately measured from the fluctuating surface of the mercury in the cistern.

The Barometer in which the error arising from the fluctuating surface of the mercury in the cistern is entirely got rid of is FORTIN'S Barometer, the arrangement consisting in applying pressure by means of a screw to the bottom of the cistern, which is made of flexible leather, thus raising or depressing the surface till it just meets the ivory point which forms the zero point of the fixed scale.

The Barometer originally constructed by Mr. Adie of London, and usually called the Board of Trade Barometer, has the great convenience of requiring no adjustment of the cistern. Its scale-inches are not true inches, but so much shorter as to compensate the error that would otherwise arise from the fluctuations of the surface of mercury in the cistern. This is an excellent Barometer for ordinary Observers, inasmuch as it entirely eliminates the error of observation likely to arise in not a few cases in setting the instrument to the zero point of the fixed scale when the light is not good. To show the accuracy with which these Barometers are made, it may be stated, that one was compared, during a whole year, with the Society's Standard Barometer, particular care being given to make the comparison when atmospheric pressure was rising or falling very rapidly, with the result that none of the readings differed from those of the Standard more than 0.003 inch.

A modification of Fortin's Barometer is used at a number of the Society's Stations, by which the coincidence of the zero point with the surface of the mercury is indicated by a little ivory float, whose stem passes freely through the lid and case of the cistern. When the index-line on this little piston-rod is brought, by the adjusting screw, to form one straight line with those on its ivory frame, the surface of the mercury is then at the exact height from which the scale is graduated. In taking an observation, this preliminary setting must be made with scrupulous accuracy; as a slight error here will vitiate the readings from the vernier.

It is absolutely necessary that the Barometer which is to be used shall have been compared with a Standard Barometer.

The Barometer should be suspended in as good a light as can be secured, and to facilitate the reading, a piece of white paper may be put behind the tube. It must be hung truly perpendicular, and exposed to neither the sun's direct rays nor the heat of a fire, and must not be hung against a wall heated by a fire. The object being to secure that the whole instrument, including the brass fittings, the contained mercury, and the attached Thermometer, shall be, when read, at one uniform temperature, it is evident that the best position is that which is least liable to sudden changes of temperature.

In taking an Observation, the Attached Thermometer is first noted; the tube must then be gently tapped, and the cistern-adjustment carefully made. The eye, by raising and lowering it, must be brought into the plane of the back and front of the index—usually the lower edge of the vernier, which must be carefully adjusted so as to form exactly a tangent to the convex surface of the mercury in the tube. Observations must be taken quickly, so as to prevent the heat from the Observer's hands and person from affecting the mercury. The use of a lens will facilitate an accurate adjustment and reading of the Barometer. A mistake not unfrequently made by those beginning to observe, consisting in setting the edge of the vernier to the level of the clear surface of the mercury which is in direct contact with the glass tube, must be carefully avoided.

The errors most frequently made in reading the Barometer are errors of 1.000 inch, 0.500 inch, and 0.050 inch; that is to say, instead of 29.365 inches, either of the following is sometimes set down—viz. as 30.365 inches, 28.365 inches, or 29.815 inches. Experience having shown that even the very best Observers make these mistakes, particular attention is directed to the matter.

When a Barometer having adjustable surfaces has to be removed from its fastenings, the ivory peg must first be screwed so as to form a tight plug to the cistern, thus preventing the escape of the mercury. Then screw up the mercury not quite to the top of the tube, but to within a quarter of an inch of it, and take down the instrument; it should then be carried with the cistern uppermost. Before suspending the Barometer for use, it must be ascertained whether the space above the mercury in the tube is a complete vacuum; this is the case if, on inclining the instrument, a sharp tap is produced when the mercury strikes the top of the tube. If a dull tap is heard, there is air in the tube, which must be got rid of.

As Barometers are liable to be deranged by the introduction of air into their tubes, on removal from place to place, or in being roughly handled, it may be useful to Observers to know how the air may be expelled. First close up the cistern by screwing the ivory peg tight, so as to prevent the escape of mercury; then screw up the mercury to about half an inch from the top of the tube; and having slowly inverted the instrument, place the top of it on a yielding substance, such as the foot, and gently tap on the cistern with the palm of the hand, so as to induce the air to ascend through the column to the cistern, whence it may escape. Since there is the weight of two atmospheres—the pressure of the mercury in the Barometer, and the air outside—pressing on any air that may be inside the tube, it is usually a tedious operation to get it wholly expelled. After repeated trials, however, it is generally accomplished; and the clear metallic sound of the mercury, when gently struck against the top of the glass tube, will show when the whole of the air has been expelled. On hanging up the Barometer, care must be taken to screw down the mercury in the tube before unfastening the float of the cistern, for, if this be not attended to, the mercury will flow out, and the instrument be seriously damaged.

FOR TAKING METEOROLOGICAL OBSERVATIONS, WITH REMARKS ON THE USE OF INSTRUMENTS.

The Council of the Society recommend that the Self-Registering Thermometers, and the Dry and Wet Bulb Hygrometers, be kept in Stevenson's Louver-boarded Box for protection to the weather, as shown in the past by repeated and annoying breakages of Thermometers of similar construction; and as regards Maximum Thermometers, either Negretti and Zambra's, or Philip's, whether they will act at the highest temperatures they may be required to register. By the laws of the Society, Members and Observers have a right to have their instruments compared by the Secretary, and to advise with him regarding the purchase of instruments. Very great care should be bestowed on the Observations of the wind.

Wind, the accuracy of which, both as regards Direction and Force, is so essential towards the right discussion of many of the more important problems of the science. A Wind-Vane ought to be elevated at least 12 feet above surrounding objects. When it oscillates incessantly, the mean direction should be taken. In all cases, but especially when the Vane is stationary, and when the wind is feeble, reference may be made to the direction of smoke, etc., in well-exposed situations. Careful observations are recommended, made on the changes in the direction of the wind; and during storms, extra observations at every hour of Greenwich time. Such a system of simultaneous observation, important at different Stations, is likely to give highly valuable and trusted results, particularly in connection with the system of thickly-planted Stations over a limited district round Edinburgh called STORM STATIONS, in the course of being established by the Society for the systematic investigation of the relation of the force of the wind to BAROMETRIC GRADIENTS, and other points connected with storms.

The Council would recommend the Hemispherical Cup Anemometer, a self-registering instrument which shows the amount of Wind that passes it per day; from which also the mean Velocity of the Wind at the time of observation may be ascertained. For indicating the Force of the Wind at any particular hour of observation, the Pressure Anemometer recently brought under the notice of the Society by Mr. T. Stevenson, the Honorary Secretary, and Mr. R. Ballingall, the Society's Observer at Ellabakk, are recommended as likely to secure uniformity in making observations on the Force of the Wind.

Many causes conspire to produce anomalies in Rain Returns, arising partly from the difficulty of obtaining a perfectly unobstructed situation for observation, and partly from the defective nature of the instruments used. The Rain Gauge should not be placed on a slope or terrace, but on a level piece of ground, in as open a situation as the Observer can secure for it. As it is often difficult to obtain a position as free and unobstructed by surrounding objects as is desirable, care should be taken to place it at some distance from shrubs, trees, buildings, or other obstructions, at least as many feet from their base as they are in height. The more important directions, towards which it is most desirable to have a free exposure, are, in the order of their importance, S.W., N.E., S.E., S., and W. The rim of the gauge must be perfectly level, and fixed so that it will remain level in all weathers, and be at a height of one foot above ground, over grass. In such gauges as Fleming's, which are furnished with a measuring rod attached to a float, the rod ought to be fixed down, and the float rise to its height only at the time the instrument is read, it being found that a stem projecting above the rim of the gauge seriously interferes with the proper measurement of the Rain-fall.

When a measuring-glass is used, care should be taken to hold it quite perpendicular. The Rain Gauge ought to be read daily at 9 A.M., and the reading entered in the Returns of the previous day. If the Gauge is read once a month, the reading is to be made on the first of the month, and the amount entered for the previous month. Snow-falls may, for convenience, be registered in the rain columns, under the following conditions:—When a Snow shower occurs, it should be noted in the 'Remarks,' and the letter S affixed to the depth of water received in Gauge. The depth of the snow must be measured in some open place where no drift is observed, and registered in addition to, and as a check upon, the indications of the Rain Gauge. For wind, rain, and snow, as indicated in every column, the Observer cannot be too careful to register observations only; and nothing that partakes of the nature of deduction or inference.

Convenient abbreviations for the nomenclature of Clouds will be found on the other side. The amount of Cloud ought to be estimated from the greater or less obscuration of the sky overhead (i.e. within 20° or 30° of the zenith). The strata of Clouds that appear near the horizon are viewed obliquely; and thus, being unable to judge of their amount, we ought not to take them into account in the Clouds' column, though their appearance and changes may be noted among the Remarks. The amount of Cloud is entered from a scale of 0 to 10; thus, when the sky overhead is free from Clouds it is entered 0, when half-covered by Clouds, 5, wholly covered, 10, and so on.

Observations of the Clouds are made at 9 A.M. and at sunset, as illustrating the condition and currents of the upper and lower regions of the atmosphere. The entries in the schedule are to be made in the following manner:—Thus, in the column Velocity and Direction, 9, S. W.

will indicate that the upper strata of Clouds travel with a W. extreme velocity from S.W. and those in the lower regions from W., with one-third the speed of the former. Again, in the second Cloud column, an entry of $\frac{1}{2}$ will indicate that the higher regions are covered to the amount of 4-tenths with stratus Clouds; and that the sky is further obscured to the extent of 2-tenths by lower Clouds of the cumulo stratus kind.

Remarks on peculiar Clouds, accompanied with drawings, will assist materially in the development of a more exact nomenclature of Clouds, as well as throw light on the electrical, and other of the more obscure phenomena of Meteorology.

The approximate number of Hours in which objects in the sun's rays cast shadows, should be entered in the proper column.

As the germination and growth of crops and plants generally depend greatly on the temperature of the soil,—its underground amount and constancy,—the Council recommend that Observations in this interesting department be made at 9 A.M., by Thermometers permanently fixed in the soil, their bulbs being sunk to depths of 3, 12, and 22 inches, and the stems above ground protected from the sun's rays, and fitted with sloping tin collars, to prevent rain-water being conveyed to the bulbs by the stems or wooden frames.

A knowledge of the Temperature of the Sea is not only in itself, but in its relations to that of our island, a most important branch of Meteorology. The Council therefore recommend that the Temperature of the Sea be carefully taken by a properly constructed apparatus, from boats, or, if this be impracticable, from the ends of piers and rocks round the coast, where it is not influenced by that of river water, and as little influenced as possible by currents sweeping along the coast, and thus acquiring the temperature of the land, either greatly heated by the sun or cooled by nocturnal radiation. At or near the time of high

water, in cases where the observations cannot be taken daily, the observation may be made on the 5th, 15th, and 25th of each month. When convenient, extra Sea Observations might be taken for other and greater depths, not infrequently the Temperature of the Air, and the Hour of Observation. It is also very desirable that observations on the daily Maxima and Minima by Thermometers continuously immersed, be instituted at points along the coast, by the method proposed by Mr. T. Stevenson, and already commenced at Peterhead and Liverpool. The Temperature of the water at the bottom of Wells ought, when practicable, to be taken, both the depth of the temperature of Wells. Wall and of the water being noted.

Mention what Test-Papers are used, Schönbein's or Mofatt's, etc. The Paper is affixed by a pin to a board in the Thermometer Box, and the indications registered at 9 A.M. and 9 P.M. It is desired that these indications be registered in connection with the force and direction of the wind at the entry in the schedule in the following manner:—thus 3rd W., as an Ozone entry in the scale, that the wind is from the N.W. and that its force on the scale 0—5 is 4, or blowing fresh.

Too much importance cannot be attached to the electric condition of the atmosphere in connection with terrestrial magnetism, barometrical, thermometrical, and meteorological phenomena generally. A proper Electrometer is, in truth, necessary to every complete meteorological observatory.

The Remarks column is unavoidably too narrow. Some of the most valuable Observations that can be taken are those for which no rules can be given nor hours assigned. The use of contractions ought, therefore, to be taken every advantage of, and a list of such as are in general use is given at the foot of the column. Besides special and extraordinary Observations, great prominence ought to be given in this column to Prevalent Diseases, differences in character, colour, velocity, and direction between the Lower and Upper Strata of clouds, the Colour of the Sky, etc. Remarks ought to be made on the occurrence of Meteors, Auroræ Boreales, remarkable depressions, elevations, and fluctuations of the Barometer, Thunder-Storms, and remarkable falls of Snow, Hail, or Rain, the Hour of Storms of Wind commencing, attaining their maximum, and ending, as well as such Notes on Storms as have been hinted at above. When lofty hills are in the vicinity of a Station, the Heights of Clouds and of the Snow-line in winter should be recorded. By the use of abbreviations, the state of the weather at 9 A.M. and 9 P.M. should be registered, either in two columns, otherwise uncoupled, or ruled off for the purpose, from the column of 'Remarks.'

Observations in connection with the Periodic Return of the Observations in Seasons, possess not only great scientific value, but connection with are of considerable importance in connection with the Periodic Re-Agriculture, Horticulture, and Natural History. The Council would direct the special attention of Observers to the registration of such phenomena, so that the published Summaries may fairly represent the whole of Scotland. Observations ought to be confined to individual trees and shrubs; to particular species of birds, and, in the case of crops, to specified sorts reared from year to year on a selected piece of ground or farm. The Annual Table, published yearly in the Society's Journal, will indicate the species of plants and animals to which special attention is more particularly directed.

The Council recommend Observers, before purchasing new instruments, and in repairing old ones, to communicate with the Meteorological Secretary, in order that every instrument may be examined and improved before being used; and they consider it necessary that he should have full power to reject any instrument which, on being presented for comparison, does not afford him satisfaction. (By Order) A. B.

EDINBURGH.

FOREST TREES.				MIGRATORY BIRDS.					
In Flower.	In Leaf.	In first Appear.	In Leaf.	Divested of Leaves.	CROPS.	Sowing or Planting.	Appearing above Ground.	In Ear or Flower.	First Out or Raised.
					Barley, . . .				
					Bare or Bigg, . . .				
					Oats, . . .				
					Wheat, . . .				
					Beans, . . .				
					Pease, . . .				
					Potatoes, . . .				
					Turnips, . . .				
					Rye Grass, . . .				

SCOTTISH METEOROLOGICAL SOCIETY.

Observations taken at Dulles Park, Aberdeen County of Aberdeen, in Lat. 57° 2' N, Long. 2° 6' W, Distance from Sea 2 miles.

Height of Cistern of the Barometer above Mean Sea-Level 44 feet, above Ground 4 feet.

During the MONTH of July — 1902.

The Hours of Observation are of Greenwich Time.

[illegible]

BAROMETER, "corrected Mean" at 9 A.M., *minus* the Correction †† } = 29.862
for Temp. (Col. 2), = .938 - .76 }

"Corrected Mean" of Barometer at 9 P.M. *minus* the Correction $\left. \begin{array}{l} \text{for Temp. (Col. 4),} \\ \text{for } \dots \dots \dots \end{array} \right\} = 29.874$

Mean at Station, corrected, and at 32°,..... = 29.868

Correction for height, feet above Mean Sea-level,..... = 49

Mean, reduced to 32°, and Sea-level, = 29.917

Highest Reading, corrected for Index error, on the 2th,..... = 30.650

Lowest Do. Do., on the 20 th,..... = 29 325

Difference, or **Monthly Range**, = 0.925"

S.-R. THERMOMETER, (in shade, etc.), Highest in Month, (corrected for Index Errors), on the 6th,..... = 72.4

Lowest in Month, corrected for Index errors, on the 13th, = 40.0

Difference, or **Monthly Range**, = 32.4

"Corrected Mean" of all the Highest, (Col. 5), = 61.9

"Corrected Mean" of all the Lowest, (Col. 6),..... = 47.6

Difference, or Mean Daily Range, = 14.43

** Calculated Mean Temperature of Month, = 54.8

S.-R. THERMOMETER, Black Bulb in Sun, Highest, (corrected for Index Errors), on the th,..... =

"Corrected **Mean**," (Col. 7), of **Black Bulb, Max. in Sun**, =

Lowest at Night, Black Bulb (corrected for Index errors), on the th, =

"Corrected Mean," (Col. 8), of Black Bulb, Min. on grass,..... =

Difference of above means or range ("exposed"), =

HYGROMETER, Mean (corrected) A.M. and P.M. Reading of Dry Bulb, (Cols. 9 and 11), =

Mean (corrected) A.M. and P.M. Reading of Wet Bulb, (Cols. 10 and 12),

‡‡ Computed Temperature of Dew-Point, =

‡‡ Do. Elastic Force of Vapour,	=
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‡ Do. Weight of Vapour in a Cubic Foot of Air, =

Relative Humidity (Saturation = 100), =

RAIN fell on 15 Days; Amount in Inches, =

WIND.		SUMMARY.									
Direction.	N	NE	E	SE	S	SW	W	NW	Calm or Variable.	Mean Force.	Mean Velocity in miles per day
A.M.	4	1	1	3	1	7	6	8	-	1.58	
P.M.	3	1	1	3	1	7	8	7	-	0.43	
Mean.	3	1	1	3	1	7	7	8	0	1.21	

* Each instrument tested at the the *Edinburgh* bears the stamp "S.M.S."; and a number to be entered in the *Heading*; or the *Number and Initials of the Maker* may be here given.
 † Embracing corrections for both *capillarity and Index Errors*.
 ‡ The *Durnal Range for Scotland* is as yet unknown.
 § Practically, though not *obscurely* a *misuse* of *correction*.
 ¶ These "Hygrometrical Deductions" are omitted from *Glaisher's Hygrometrical Tables, Second Edition*, only.
 ** While the *Durnal Range* is unknown, the *Arithmetical Mean* of *Cols. 8 and 6* will be entered as the "*Calculated Mean Temperature*."
 Any observations not taken under the *Conditions* specified in the *Directions* on the *other side*, or noted at the *Top* of each column, must be marked as such by the *Observer*, in each *Schedule*. See *over*.

SCOTTISH METEOROLOGICAL SOCIETY.

Observations taken at Duthie Park, Aberdeen, County of Aberdeen, in Lat. 57° 9' N, Long. 2° 6' W, Distance from Sea 2 miles.

Height of Cistern of the Barometer above Mean Sea-Level 44 feet, above Ground 4 feet.

During the MONTH of August 1902.

The Hours of Observation are of Greenwich Time.

ELECTRICITY.	Days of Month.	BAROMETER.				SELF-REGISTERING THERMOMETERS. Read Daily, at 9 P.M.				HYGROMETER.				Rain.	WIND.				CLOUDS.				SUNSHINE. Hours.	THERMOMETERS under Ground.			SEA.	OZONE.	GENERAL REMARKS. As to occurrence of Thunder, Lightning, Storms, Hail, Meteors, Remarkable Depression or Elevation of Barometer, Prevalent Diseases, etc. <i>Mention the hour at which Storms, including Thunder and Lightning, began and ended.</i>	Days of Month.						
		9 h. A.M.		9 h. P.M.		Protected in Shade, 4 feet above Ground.		Exposed Black Bulbs.		9 h. A.M.		9 h. P.M.			9 h. A.M.		9 h. P.M.		9 A.M.		P.M.			9 h. A.M.												
		Barometer.	Attached Thermometer.	Barometer.	Attached Thermometer.	Max.	Min.	Max. in Sun's rays.	Min. on Grass.	Dry bulb.	Wet bulb.	Dry bulb.	Wet bulb.		No. of hours in which it fell.	Amount in inches.	Direction.	Force.	Direction.	Force.	Readings of the H. Cup Anemometer. No.	Velocity (0-5) and Species.		Amount (0-10), and Species.	Velocity (0-5) and Species.	Amount (0-10), and Species.					No. 3 inches.	No. 12 inches.	No. 22 inches.			
		* No.		No.		No.	No.	No.	No.	Dry bulb.	Wet bulb.	Dry bulb.	Wet bulb.		No.	No.																				
		inches.	°	inches.	°	°	°	°	°	°	°	°	°		°	°	°	°	°	°	°	°		°	°	°					°	°	°	°	°	°
	1	30.150	55.	30.000	56.	62.0	45.0			54.0	52.0	53.2	51.0	0.08	S	0.5	S	1			8	3								fair mild all day.	1					
	2	29.990	56.	29.900	57.	63.0	46.5			54.0	52.8	53.1	48.8	0.04	SW	1	SW	0.5			10	6								rain clearing afternoon	2					
	3	29.900	56.	29.755	58.	57.2	48.6			53.0	53.5	52.2	51.8	0.68	NW	1	NW	1			10	10								rain most of the day	3					
	4	29.836	57.	29.925	56.	61.2	50.8			53.8	54.0	52.4	51.4	0.01	NW	1	N	1			10	10								dull some rain	4					
	5	30.000	53.	30.075	53.	60.0	49.4			54.2	50.5	50.0	49.0	0.03	N	1	N	0.5			8	10								dull fair	5					
	6	30.055	54.	30.000	53.	60.2	47.5			53.0	50.0	49.8	48.0	0.00	NW	1	NW	1			5	6								fair & fine	6					
	7	29.945	53.	29.950	45.	53.0	45.0			57.2	49.0	51.2	49.0	0.04	NW	1	NW	1			8	8								dull fair, rain after P.M.	7					
	8	29.937	45.	29.950	53.	56.0	44.0			56.0	49.0	57.0	54.0	0.00	NW	2	NW	1			8	8								dull some slight rain	8					
	9	30.050	53.	30.000	54.	59.0	44.0			57.0	56.0	50.0	48.2	0.24	NW	1	NW	1			6	8								dull all day	9					
	10	29.950	54.	29.950	53.	57.0	45.0			52.2	47.0	47.0	45.0	0.03	NW	2	NW	3			4	5								fair been rain	10					
	11	29.910	52.	29.955	53.	61.0	46.6			53.5	48.0	48.0	46.2	0.00	NW	3	NW	2			2	0								fair cool	11					
	12	30.010	53.	30.060	54.	52.0	45.5			57.0	47.0	48.2	46.0	0.00	NW	2	NW	2			8	5								fair cool	12					
	13	30.000	54.	30.000	53.	54.0	44.0			52.0	48.5	49.0	48.0	0.00	NW	1	NW	1			6	5								fair	13					
	14	29.957	53.	29.969	54.0	54.0	47.0			57.0	48.0	49.5	48.0	0.00	NW	1	NW	1			5	4								dull like rain	14					
	15	29.884	54.	29.890	53.	65.0	49.0			60.0	57.0	58.5	57.0	0.28	NW	1	NW	1			10	8								rain heavy at times	15					
	16	29.850	54.	29.805	54.	61.4	48.0			58.5	57.0	56.0	55.0	0.00	NW	1	NW	1			8	6								fair dull	16					
	17	29.800	56.	29.750	58.	62.2	46.0			58.0	56.2	56.5	54.0	0.33	SW	1	S	1			6	8								rain, had been rain	17					
	18	29.600	59.	29.550	56.	64.0	46.0			54.0	52.0	56.0	54.0	0.32	NW	1	N	1			8	8								heavy showers afternoon	18					
	19	29.645	56.	29.760	53.	58.4	48.0			52.0	49.0	53.0	50.1	0.00	NW	1	S	1			8	8								fair unsettled all day	19					
	20	29.655	56.	29.860	59.	62.6	47.0			56.0	52.0	52.5	50.5	0.45	SW	1	NW	1.5			6	6								fair, then heavy showers	20					
	21	30.050	53.	30.120	53.	57.0	43.0			50.0	47.0	47.2	45.2	0.06	NW	2	S	1			8	6								fair dull.	21					
	22	30.015	57.	29.900	59.	63.2	47.0			54.0	53.0	53.5	51.0	0.02	NW	1	S	2			10	10								wet, dull.	22					
	23	29.680	57.	29.745	62.	68.4	47.0			58.0	52.0	59.8	55.6	0.00	SW	1	S	1			8	6								fair and fine	23					
	24	29.700	57.	29.750	61.	69.8	50.0			58.0	55.0	55.2	53.2	0.00	SW	1	S	1			2	4								do do	24					
	25	29.575	60.	29.950	57.	64.0	48.0			57.0	53.0	56.0	54.5	0.02	W	1	W	0.5			5	8								fair some rain	25					
	26	29.970	58.	29.995	59.	69.0	44.5			58.4	54.8	44.5	42.2	0.00	SW	1	S	1.5			2	5								fair & fine	26					
	27	29.980	59.	29.990	57.	62.5	51.0			59.0	56.8	54.0	52.0	0.00	SE	1	SE	1			5	10								do	27					
	28	29.930	59.	29.850	58.	64.8	48.0			53.6	54.0	54.0	52.2	0.09	S	1	S	1			6	10								do	28					
	29	29.850	58.	29.850	56.	65.2	47.6			53.4	50.8	51.0	58.0	0.00	W	1	W	1			2	5								do	29					
	30	29.850	57.	29.905	57.	65.0	42.0			54.0	51.2	51.5	49.8	0.00	NW	1	W	1			8	9								fair dull	30					
	31	29.895	57.	29.900	57.	60.5	42.0			53.0	51.8	54.0	52.2	0.00	SW	1	SW	1			3	8								fair dull	31					
	Sums.	9135	17	1025	17	125	175			133	145	156	148																			NOTATION USED IN GENERAL REMARKS.				
	Means.	29.888	56.0	29.898	55.9	60.9	46.5			54.7	51.9	52.3	50.6																							
	+ Total Corrections for Instrumental Errors.	-010		-010																																
	+ Corrections for Diurnal Range.																																			
	"Corrected Means."	29.878		29.888																																
	No. of Column.	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30					

BAROMETER, "corrected Mean" at 9 A.M., minus the Correction ++ for Temp. (Col. 2), =	29.807
"Corrected Mean" of Barometer at 9 P.M., minus the Correction ++ for Temp. (Col. 4), =	29.818
Mean at Station, corrected, and at 32°, =	29.812
Correction for height, feet above Mean Sea-level, =	46
Mean, reduced to 32°, and Sea-level, =	29.860
Highest Reading, corrected for Index error, on the 18th, =	30.140
Lowest Do. Do., on the 18th, =	29.540
Difference, or Monthly Range, =	0.600

S.-R. THERMOMETER, (in shade, etc.), Highest in Month, (corrected for Index Errors), on the 29th, =	69.8
Lowest in Month, corrected for Index errors, on the 30th, =	42.0
Difference, or Monthly Range, =	27.8
"Corrected Mean" of all the Highest, (Col. 5), =	60.9
"Corrected Mean" of all the Lowest, (Col. 6), =	46.5
Difference, or Mean Daily Range, =	14.4
** Calculated Mean Temperature of Month, =	53.7
S.-R. THERMOMETER, Black Bulb in Sun, Highest, (corrected for Index Errors), on the th, =	
"Corrected Mean," (Col. 7), of Black Bulb, Max. in Sun, =	
Lowest at Night, Black Bulb (corrected for Index errors), on the th, =	
"Corrected Mean," (Col. 8), of Black Bulb, Min. on grass, =	
Difference of above means or range ("exposed"), =	

HYGROMETER, Mean (corrected) A.M. and P.M. Reading of Dry Bulb, (Cols. 9 and 11), =	53.5
Mean (corrected) A.M. and P.M. Reading of Wet Bulb, (Cols. 10 and 12), =	51.2
Computed Temperature of Dew-Point, =	48.9
Do. Elastic Force of Vapour, =	34.5
Do. Weight of Vapour in a Cubic Foot of Air, =	
Relative Humidity (Saturation = 100), =	84
RAIN fell on 16 Days; Amount in Inches, =	2.75

WIND.		SUMMARY.									
Direction.		N	NE	E	SE	S	SW	W	NW	Calm or Variable.	Mean Force.
A.M.		1	5	0	1	2	7	2	13	0	1.18
P.M.		2	5	1	9	2	2	8	0		1.14
Mean.		2	5	1	5	2	10	0			1.16

* Each instrument tested at the Office in Edinburgh bears the stamp "S.M.S.," and a number to be entered in the Heading; or the Number and Initials of the Maker may be given.
 † Embracing corrections for both capillarity and Index Errors.
 ‡ The Diurnal Range for Scotland is as yet unknown.
 § Frequently, though not absolutely a wise correction.
 || These "Hygrometrical Deductions" are calculated from Glaisher's Hygrometrical Tables, Second Edition only.
 ** While the Diurnal Range is unknown, the Arithmetic Mean of Cols. 5 and 6 will be entered as the "Calculated Mean Temperature."
 Any observations not taken under the Conditions specified in the Directions on the other side, or noted at the Top of each column, must be marked as such by the observer, in each Schedule. See over.

Observations made and
Return verified by

(Signed)

Peter Harper

Some fine days & light

SCOTTISH METEOROLOGICAL SOCIETY.

Observations taken at Duthie Park, Aberdeen, County of Aberdeen, in Lat. 57° 9' N, Long. 2° 6' W, Distance from Sea 2 miles.Height of Cistern of the Barometer above Mean Sea-Level 44 feet, above Ground 4 feet.During the MONTH of September 1902.

The Hours of Observation are of Greenwich Time.

ELECTRICITY.	Days of Month.	BAROMETER.				SELF-REGISTERING THERMOMETERS. Read Daily, at 9 P.M.				HYGROMETER.				Rain.		WIND.				CLOUDS.				THERMOMETERS under Ground.				SEA.	OZONE.	GENERAL REMARKS. As to occurrence of Thunder, Lightning, Storms, Hail, Meteors, Remarkable Depression or Elevation of Barometer, Prevalent Diseases, etc. Mention the hour at which Storms, including Thunder and Lightning, began and ended.	Days of Month.				
		9 h. A.M.		9 h. P.M.		Protected in Shade, 4 feet above Ground.		Exposed Black Bulbs.		9 h. A.M.		9 h. P.M.		No. of hours in which it fell.	Amount in inches.	9 h. A.M.		9 h. P.M.		Readings of the H. Cup Anemometer No.	9 A.M.		P.M.		9 h. A.M.							Temperature of Wind at height of feet, No.	Temperature at 1 fathom and Density.	0—10.	
		Barometer. * No.	Attached Ther- mometer	Barometer. No.	Attached Ther- mometer	Max. No.	Min. No.	Max. in Sun's rays No.	Min. on Grass. No.	Dry bulb.	Wet bulb.	Dry bulb.	Wet bulb.			Direction.	Force	Direction.	Force		Velocity (0—6) and Direction.	Amount (0—10), and Species.	Velocity (0—6) and Direction.	Amount (0—10), and Species.	No. 9 inches.	No. 12 inches.	No. 25 inches.							No. 9 A.M.	No. 9 P.M.
1	29.900	52.	29.795	57.	58.0	49.0				55.4	53.8	55.0	53.0	0.05	S	1	S	2		8	ci	pg								dull some rain	1				
2	29.670	58.	29.705	59.	62.0	52.8				57.8	56.0	57.0	53.0	0.07	S	2	S	1		5	ci	pg								fair dull	2				
3	29.355	55.	29.455	57.	61.0	48.0				57.4	57.0	58.5	50.0	0.16	SE	1	SE	3		10	ci	pg								dull showers.	3				
4	29.525	58.	29.740	59.	61.6	48.2				56.5	54.0	56.5	51.0	0.00	W	1	W	1		8	ci	pg								showers fair from 10 a.m.	4				
5	29.950	55.	29.995	56.	62.4	46.0				53.2	49.0	51.2	50.0	0.02	W	1	S	1		3	ci	pg								fair fine	5				
6	29.960	56.	30.050	59.	70.0	47.0				55.8	54.8	56.0	56.0	0.00	SW	1	E	1		6	ci	pg								fair fine all day	6				
7	30.160	58.	30.225	58.	68.0	51.0				56.8	53.5	53.5	50.0	0.00	SE	1	S	0.5		5	ci	pg								do do	7				
8	30.235	56.	30.200	58.	65.5	47.2				52.4	52.0	51.8	50.4	0.00	SW	0.5	E	0.5		0	ci	pg								do do	8				
9	30.160	57.	30.200	57.	57.5	45.2				54.0	53.0	51.0	48.0	0.00	NE	1	NE	1		8	ci	pg								do do	9				
10	30.205	52.	30.200	54.	53.2	45.4				50.0	47.2	46.0	43.8	0.00	NE	1	NE	1		8	ci	pg								fair dull	10				
11	30.090	49.	29.950	52.	61.0	37.6				46.8	44.5	44.5	43.8	0.00	NE	1	SE	1		6	ci	pg								fair cool all day	11				
12	29.650	58.	29.890	50.	52.0	41.0				47.6	46.5	42.0	41.0	0.06	NE	2	NE	2		6	ci	pg								unsettled showers all day	12				
13	29.945	51.	29.745	50.	53.5	40.0				46.0	44.8	49.0	47.0	0.02	NE	2	NE	1		3	ci	pg								fair, dull P.M.	13				
14	29.710	52.	29.775	54.	54.0	40.0				47.5	47.4	49.0	47.0	0.00	NE	1	S	1		8	ci	pg								dull fair all day	14				
15	29.575	52.	29.475	55.	57.5	44.5				51.4	50.0	46.6	43.0	0.08	SW	1	SE	0.5		8	ci	pg								dull, heavy showers fair P.M.	15				
16	29.350	52.	29.400	56.	55.5	40.4				43.6	42.0	42.0	41.0	0.10	SW	0.5	NE	2		4	ci	pg								fair, showers afternoon	16				
17	29.710	53.	29.995	56.	55.0	40.6				49.0	46.2	47.0	45.5	0.06	NE	3	NE	3		4	ci	pg								showers unsettled all day	17				
18	30.120	57.	30.275	54.	55.0	43.0				49.0	45.0	43.8	42.0	0.00	NE	1.5	N	0.5		4	ci	pg								fair fine all day	18				
19	30.350	50.	30.400	53.	54.0	38.2				44.0	43.0	47.0	46.8	0.00	SW	0.5	S	1		5	ci	pg								do do	19				
20	30.300	52.	30.245	56.	53.2	43.0				52.6	51.4	52.2	51.0	0.00	S	1	SE	1		10	ci	pg								do Dull	20				
21	30.200	56.	30.180	57.	56.0	47.8				54.0	52.2	54.0	51.0	0.00	S	2	S	2		8	ci	pg								dull fair	21				
22	30.075	54.	30.080	55.	57.0	42.5				54.0	53.0	54.5	53.5	0.60	SE	2	S	2		10	ci	pg								rain from 9 A.M.	22				
23	30.000	57.	29.780	57.	55.0	40.5				53.4	53.0	52.0	51.0	0.06	SE	2	SE	1		10	ci	pg								heavy rain, fair, rain P.M.	23				
24	29.990	57.	30.045	58.	63.0	46.0				53.0	53.0	48.4	46.5	0.00	SW	1	SW	0.5		6	ci	pg								fair fine	24				
25	30.250	53.	30.345	58	61.6	38.0				52.5	51.2	55.0	53.5	0.00	SW	1	SW	0.5		4	ci	pg								fair white frost, fine	25				
26	30.400	55.	30.400	58.	64.0	46.0				57.5	50.8	54.6	53.0	0.06	SW	1	SW	0.5		3	ci	pg								fair fine slight showers, dull	26				
27	30.405	54.	30.525	58.	58.6	50.4				54.0	53.4	52.6	51.0	0.01	SW	1	SW	1		10	ci	pg								dull all day	27				
28	30.525	57.	30.545	57.	57.5	49.0				57.8	50.0	52.5	51.5	0.00	SW	0.5	S	0.5		10	ci	pg								dull damp fog	28				
29	30.410	56.	30.350	58.	60.0	50.6				56.6	53.0	54.0	51.8	0.00	W	1	NE	1		8	ci	pg								dull fair	29				
30	30.250	55.	30.210	59.	58.0	50.0				54.0	51.8	51.5	50.0	0.01	NE	1	N	1		10	ci	pg								dull fair	30				
31																																			
Sums.	1311.4	13	1413.7	18	135.1	126				150	106	136	65	5		2	4			12	11														
Means.	30.015	54.0	30.046	56.2	58.4	45.8				52.0	50.5	50.7	46.7			1.8	1.1			6.6	6.5														
+ Total Corrections for Instrumental Errors.	-0.010		-0.010																																
+ Corrections for Diurnal Range.																																			
"Corrected Means."	30.005		30.036																																
No. of Column.	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30					

NOTATION USED IN GENERAL REMARKS.					
a.	denotes aurora.	m.	denotes meteor.		
ci.	" cirrus.	ms.	" meteor.		
ci.-cu.	" cirro-cumulus.	n.	" nimbus.		
ci.-s.	" cirro-stratus.	r.	" rain.		
cu.	" cumulus.	h. r.	" heavy rain.		
cu.-s.	" cumulo-stratus.	c. h. r.	" continued heavy rain.		
d.	" dew.	s.	" stratus.		
f.	" fog.	sc.	" scud.		
fr.	" frost.	s.	" sleet.		
h.-fr.	" hear-frost.	s.	" snow.		
h.	" haze.	so. ha.	" solar halo.		
h. d.	" heavy dew.	sq.	" squall.		
hl.	" hail.	sg.	" squalls.		
l.	" lightning.	t.	" thunder.		
li. cl.	" light clouds.	t. s.	" thunder-storm.		
li. sh.	" light showers.	w.	" wind.		
lu. co.	" lunar corona.	g.	" gale of wind.		
lu. ha.	" lunar halo.				

TABLE FOR ESTIMATING FORCE OF WIND.					
Estimated Force, 0—6.	Common Designation.	Estimated Force, 0—6.	Common Designation.	Estimated Force, 0—6.	Common Designation.
0	Calm	1-5	Light breeze	4	Blowing hard
0.5	Very light air	2-3	Fresh breeze	5	Blowing a gale
1	Light air		Very fresh	6	Violent gale

BAROMETER, "corrected Mean" at 9 A.M., minus the Correction for Temp. (Col. 2), = 29.937
"Corrected Mean" of Barometer at 9 P.M., minus the Correction for Temp. (Col. 4), = 29.962
Mean at Station, corrected, and at 32°, = 29.950
Correction for height, feet above Mean Sea-level, = 49
Mean, reduced to 32°, and Sea-level, = 29.999
Highest Reading, corrected for Index error, on the 20th, = 30.545
Lowest Do. Do., on the 3th, = 29.355
Difference, or Monthly Range, = 1.190

S.-R. THERMOMETER, (in shade, etc.), Highest in Month, (corrected for Index Errors), on the 6th, = 70.0
Lowest in Month, corrected for Index errors, on the 11th, = 37.6
Difference, or Monthly Range, = 32.4
"Corrected Mean" of all the Highest, (Col. 5), = 58.4
"Corrected Mean" of all the Lowest, (Col. 6), = 45.8
Difference, or Mean Daily Range, = 12.6
** Calculated Mean Temperature of Month, = 52.1
S.-R. THERMOMETER, Black Bulb in Sun, Highest, (corrected for Index Errors), on the th, =
"Corrected Mean," (Col. 7), of Black Bulb, Max. in Sun, =
Lowest at Night, Black Bulb (corrected for Index errors), on the th, =
"Corrected Mean," (Col. 8), of Black Bulb, Min. on grass, =
Difference of above means or range ("exposed"), =

HYGROMETER, Mean (corrected) A.M. and P.M. Reading of Dry Bulb, (Cols. 9 and 11), = 57.4
Mean (corrected) A.M. and P.M. Reading of Wet Bulb, (Cols. 10 and 12), = 49.6
† Computed Temperature of Dew-Point, = 47.8
† Do. Elastic Force of Vapour, = 0.333
† Do. Weight of Vapour in a Cubic Foot of Air, = 98
† Relative Humidity (Saturation = 100), = 88
RAIN fell on 14 Days; Amount in Inches, = 1.36

WIND.		SUMMARY.									
Direction.		N	NE	E	SE	S	SW	W	NW	Calm or Variable.	Mean Force.
A.M.		-	4	-	4	4	10	3	5	-	1.18
P.M.		2	2	2	4	8	5	2	5	-	1.17
Mean.		1	3	1	4	6	7	3	5	0	1.18

Observations made and
Return verified by(Signed) Peter Harper

OBSERVATIONS,

correct numbering of the scale of every instrument, the rejection of Thermometers the frameworks of which are not likely to expand or contract, the use of the same for all observations, and exposure to the weather, as shown in the past by repeated and annoying breakages of Thermometers of similar construction; and as regards Maximum Thermometers, either Negretti and Zambra's, or Phillips's, whether they will act at the highest temperatures they may be required to register. By the laws of the Society, Members and Observers have a right to have their instruments compared by the Secretary, and to advise with him regarding the purchase of instruments of the best quality.

Very great care should be bestowed on the Observations of the Wind, and the accuracy of which, both as regards Direction and Force, is so essential towards the right discussion of many of the more important problems of the science.

A Wind-Vane ought to be elevated at least 12 feet above surrounding objects. When it oscillates incessantly the direction of the mean direction should be taken. In all cases, but especially when the Vane is stationary, and when the wind is feeble, reference may be made to the direction of smoke, etc., in well-exposed situations. Careful observations are recommended to be made on the changes in the direction of the wind; and during storms, extra observations every hour of Greenwich time. Such a system of simultaneous observation, pursued at different Stations, is likely to give highly valuable and important results, particularly in connection with the system of thickly-planted Stations over a limited district round Edinburgh called STORM STATIONS, in the course of being established by the Society for the systematic investigation of the relation of the force of the wind to BAROMETRIC GRADIENTS, and other points connected with storms.

The Council would recommend the Houspherical Cup Anemometer, a self-registering instrument which shows the amount of Wind that passes it per day; from which also the mean Velocity of the Wind at the time of observation may be ascertained. For indicating the Force of the Wind at any particular hour of observation, the Pressure Anemometers recently brought under the notice of the Society by Mr. T. Stevenson, the Honorary Secretary, and Mr. R. Ballingall, by Mr. S. Observer at Eddisbury, are recommended as likely to secure uniformity in making observations on the Force of the Wind.

Many causes conspire to produce anomalies in Rain Returns, arising partly from the difficulty of obtaining a perfectly unobjectionable situation for observation, and partly from the defective nature of the instruments used. The Rain Gauge should, not be placed on a slope or terrace, but on a level piece of ground, in an open situation as the Observer can see for it. "As it is often difficult to obtain a position as free and unobstructed by surrounding objects as is desirable, care should be taken to place it at some distance from shrubs, trees, buildings, or other obstructions, at least as many feet from their base as they are in height. The more important directions, towards which it is most desirable to have a free exposure, are, in the order of their importance, S.W., E.S.E., S., and W. The rim of the gauge must be perfectly level, and fixed so that it will remain level in all weathers, and be at a height of one foot above ground, over grass. In such gauges as Fleming's, which are furnished with a measuring-rod attached to it, the rod ought to be fixed down, and the float rise to its height only at the time the instrument is read, it being found that a stem projecting above the rim of the gauge seriously interferes with the proper measurement of the Rain-fall. When a measuring-glass is used, care ought to be taken to hold it quite perpendicular. The Rain Gauge ought to be read daily at 9 A.M., and the reading entered in the Returns of the previous day. If the Gauge is used once a month, the reading is to be made on the first of the month, and the amount entered for the previous month.

Snow-falls may, for convenience, be registered in the rain columns, under the following conditions:—When a Snow shower occurs, it should be noted in the "Remarks," and the letter S annexed to the depth of water received in Gauge. The depth of the snow must be measured in some open place where no drift is observed, and registered in addition to, and as a check upon, the indications of the Rain gauge. For wind, and snow,

As Barometers are liable to be damaged by the introduction of air into their tubes, on removal from place to place, or in being roughly handled, it may be useful to Observers to know how the air may be expelled. It may be done by screwing the ivory screw tight, so as to prevent the escape of mercury; they screw up the ivory tap, to about half an inch from the top of the tube; and having slowly inverted the instrument, place the top of it on a yielding substance, such as the book and gently tap on the cistern with the palm of the hand, so as to induce the air to ascend through the column to the cistern, whence it may escape. Since there is the weight of two atmospheres—the pressure of the mercury in the Barometer, and the air outside—pressing on any air that may be enclosed inside the tube, it is usually a tedious operation to get it wholly expelled. After repeated trials, however, it is generally accomplished, and the clear metallic sound of the mercury when gently struck against the top of the glass tube, will show when the whole of the air has been expelled. On hanging up the Barometer, care must be taken to screw down the mercury in the tube before unfastening the flow of the cistern, for, if this be not attended to, the mercury will fall from it, and the instrument be seriously damaged.

correct numbering of the scale of every instrument, and the rejection of Thermometers the frameworks of which are not likely to stand the pressure to the weather, as shown in the past by repeated and irregular breakages of Thermometers of similar construction; and as regards Maximum Thermometers, either Negretti and Zambra's, or Phillips' and others, which will act at the highest temperatures they may be required to register. By the laws of the Society, Members and Observers have a right to have their instruments compared by the Secretary, and to advise with him regarding the purchase of instruments of the best quality.

Very great care should be bestowed on the Observations of the Sea.

Wind. Wind, and force of wind, both as regards Direction and Force, is so essential towards the right discussion of many of the more important problems of the science, that the observations of the Wind should be made with the greatest accuracy.

A Wind-Vane ought to be elevated at least 12 feet above surrounding objects. When it oscillates incessantly the higher the vane is raised, the more accurate will be the observations.

1. As regards Direction. The direction of the wind, especially when the Vane is stationary, and when the wind is feeble, reference may be made to the direction of smoke, etc., in well-exposed situations. Careful observations are recommended to be made on the changes in the direction of the wind; and during storms, extra observations at every hour of Greenwich time. Such a system of simultaneous observation, pursued at different Stations, is likely to give highly valuable and important results, particularly in connection with the system of thickly-planted Stations over a limited district round Edinburgh called STORM STATIONS, in the course of being established by the Society for the systematic investigation of the relation of the force of the wind to BAROMETRIC GRADIENTS, and other points connected with storms.

The Council would recommend the Houspherical Cup Anemometer, a self-registering instrument which shows the amount of Wind that passes it per day; from which, with also the mean Velocity of the Wind at the time of observation may be ascertained. For indicating the Force of the Wind at any particular hour of observation, the Pressures of Anemometers recently brought under the notice of the Society by Mr. T. Stevenson, the Honorary Secretary, and Mr. R. Ballingall, the Society's Observer at Eullabuss, are recommended as likely to secure uniformity in making observations on the Force of the Wind.

Many causes conspire to produce anomalies in Rain Returns, arising partly from the difficulty of obtaining a Rain Gauge, perfectly unobjectionable situation for observation, and partly from the defective nature of the instruments used. The Rain Gauge should not be placed on a slope or terrace, but on a level piece of ground, in an open situation as the Observer can see for it. As it is often difficult to obtain a position as free and unobstructed by surrounding objects as is desirable, care should be taken to place it at some distance from shrubs, trees, buildings, or other obstructions, at least as many feet from their base as they are in height. The more important directions, towards which it is most desirable to have a free exposure, are, in the order of their importance, S.W., N.E., S.E., S., and W. The rim of the gauge must be perfectly level, and fixed so that it will remain level in all weathers, and be at a height of one foot above ground, over grass. In such gauges as Fleming's, which are furnished with a measuring-rod attached to it, the rod ought to be fixed down, and the float rise to its height only at the time the instrument is read, it being found that a stem projecting above the rim of the gauge seriously interferes with the proper measurement of the Rain-fall. When a measuring-glass is used, care should be taken to hold it quite perpendicular. The Rain Gauge ought to be read daily at 9 A.M., and the reading entered in the Returns of the previous day. If the Gauge is the reading once a month, the reading is to be made on the first of the month, and the amount entered for the previous month. Snow-falls may, for convenience, be registered in the rain column, under the following conditions:—When a Snow shower occurs, it should be noted in the "Remarks," and the letter S annexed to the depth of water received in Gauge. The depth of the snow must be measured in some open place where no drift is observed, and registered in addition to, and as a check upon, the indications of the Rain Gauge. For wind, rain, and snow, as indicated in every column, the Observer cannot be too careful to register observations only; and nothing that partakes of the nature of deduction or inference.

Convenient abbreviations for the nomenclature of Clouds will be found on the other side. The amount of Cloud ought to be estimated from the greater or less observation of the sky overhead (i.e. within 20° or 30° of the zenith). The strata of Clouds that appear near the horizon are viewed obliquely; and, thus, being unable to judge of their amount, we ought not to take them into account in the Clouds column, though their appearance and change would be noticed in the "Remarks." The amount of Cloud is taken from Clouds being 0 to 10; thus, when the sky overhead is free from Clouds it is entered 0, when half-covered by Clouds 5, wholly covered 10, and so on.

Observations of the Clouds are to be made at 9 A.M. and at sunset, as illustrating the condition and changes of the upper and lower regions of the atmosphere. The entries in the schedule are to be made in the following manner:—Thus, in the column Velocity and Direction, S. S. W. will indicate that the upper strata of Clouds travel with 2 W. Cloud column, an entry of 2, will indicate that the higher regions are covered to the amount of 4-tenths with stratus Clouds; and that the sky is further obscured to the extent of 2-tenths by lower Clouds of the cumulo stratus kind.

Remarks on peculiar Clouds, accompanied with drawings, will assist materially in the development of a more exact nomenclature of Clouds, as well as throw light on the electrical, and other of the more obscure phenomena of Meteorology.

The approximate number of Hours in which objects in the upper strata cast shadows, should be entered in the proper column.

As the germination and growth of crops and plants generally depend greatly on the temperature of the soil—this being an important branch of Meteorology. The Council therefore recommend that the Temperature of the Sea be carefully taken by a properly constructed apparatus, from boats, or, if this be impracticable, from the ends of piers and rocks round the coast, where it is not influenced by that of river water, and as little influenced as possible by currents sweeping along the coast, and thus acquiring the temperature of the land, either greatly heated by the sun or cooled by nocturnal radiation. At or near the time of high

water, in cases where the observations cannot be taken daily, when convenient, extra Sea Observations might be taken, and greater depths, extending always to the Temperature of the Air, and the daily Maxima and Minima. It is also very desirable that observations on the Sea, by Thermometers continuously immersed, be instituted at points along the coast, by the method proposed by Mr. T. Stevenson, and already commenced at Feterhead and Liverpool.

The Temperature of the water at the bottom of Wells ought, when practicable, to be taken, both the depth of the water and that of the water being noted.

Mention what Pest-Plagues are met, Scutellum's or Mollusks, etc.

Ozone. The Paper should be placed by night on a board in the thermometer Box, and the instrument is registered at 9 A.M. and 9 P.M. It is desired that these indications be registered in connection with the force and direction of the wind, and the time of observation, in the following manner:—thus 8 A.M., as an Ozone early in the schedule will indicate that the Ozone paper is turned as 5 on the scale, that the wind is from the N.W., and that its force on the scale 0—5 is 4 or blowing fresh.

Too much importance cannot be attached to the electric condition of the atmosphere in connection with terrestrial, astronomical, and meteorological phenomena generally. A proper Electrometer is, in truth, necessary to every complete meteorological observatory.

The Remarks column is unavoidably too narrow. Some of the Remarks, most valuable Observations that can be taken are those for which no rules can be given for hours assigned. The use of contractions ought, therefore, to be taken every advantage of, and a list of such to be given, to be taken at the foot of the column. Besides special and extraordinary observations, great prominence ought to be given in this column to Principal Diseases, differences in character of colour, velocity, and direction between the Lower and Upper Strata of clouds, the Colour of the Sky, &c. Remarks ought to be made on the occurrence of Meteors, Auroræ Boreales, remarkable depressions, elevations, and fluctuations of the Barometer, Thunder-Storms, and remarkable falls of Snow, Hail or Rain, the Hour of Storms of Wind commencing, attaining their maximum, and ending, as well as such Notes on Storms as have been hinted at above. When lofty hills are in the vicinity of a Station, the Height of Clouds and of the Snow-line in winter should be recorded.

By the use of abbreviations, the state of the weather at 9 A.M. and 9 P.M. should be registered, either in two columns, otherwise occupied, or ruled off for the purpose, from the column of Remarks.

Observations in connection with the Periodic Return of the Seasons, possess not only great scientific value, but connection with one of considerable importance in connection with the Periodic Re-Agriculture, Horticulture, and Natural History. The Council would direct the special attention of Observers to the registration of such phenomena, so that the published Summaries may fairly represent the whole of Scotland. Observations ought to be confined to individual trees and shrubs; to particular species of birds, and, in the case of crops, to specified sorts reared from year to year on a selected piece of ground or farm. The Annual Table, published yearly in the Society's Journal, will indicate the species of plants and animals to which special attention is more particularly directed.

The Council recommend Observers, before purchasing new instruments, and in repairing old ones, to communicate with the Meteorological Secretary, in order that every instrument may be examined and improved before being used; and they consider it necessary that he should have full power to reject any instrument which, on being presented for comparison, does not afford him satisfaction.

A. B.
(By Order)

EDINBURGH,

OBSERVATIONS IN CONNECTION WITH THE PERIODICAL RETURN OF THE SEASONS.

FOREST TREES.	Flower.	In Leaf.	Divested of Leaves.	CROPS.	Planting or Sowing or above Ground.	In Ear.	First Cut
Alder.				Barley.			
Asp.				Oats.			
Beech.				Wheat.			
Elm.				Pease.			
Larch.				Potatoes.			
Time.				Turnips.			
Oak.				Rye Grass.			
Sycamore or Plane.							

SHRUBS, ETC.		Blossom.	FRUITS.	Blossom.	Fruit ripe generally.	MIGRATORY BIRDS.	Arrival.	Departure.
Barberry.			Apple.		Cuckoo.			
Bountree or Elder,			Black Currant,		Curlew.			
Broom.			Cherry.		House-Swallow,			
Hazel,			Gean.		Lapwing.			
Tawthorn,			Gooseberry,		Plover,			
Holly,			Peach,		Sand Martin,			
Raburnum,			Pear.		Starling,			
Ailac,			Plum,		Swan,			
Desereon,			Strawberry,		Rail or Corn Crane,			
Mountain Ash or Rowan,								
Red Flowering Currant,								
Rhododendron Pontheum,								
Vin,								

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

[illegible]

SCOTTISH METEOROLOGICAL SOCIETY.

Observations taken at Duthie Park Aberdeen, County of Aberdeen, in Lat. 57° 9' N, Long. 2° 6' W, Distance from Sea 2 miles.Height of Cistern of the Barometer above Mean Sea-Level 44 feet, above Ground 4 feet.During the MONTH of October 1902.

The Hours of Observation are of Greenwich Time.

ELECTRICITY.	Days of Month.	BAROMETER.				SELF-REGISTERING THERMOMETERS. Read Daily, at 9 P.M.				HYGROMETER.				Rain.		WIND.				CLOUDS.				THERMOMETERS under Ground.			SEA.	OZONE.	GENERAL REMARKS. As to occurrence of Thunder, Lightning, Storms, Hail, Meteors, Remarkable Depression or Elevation of Barometer, Prevalent Diseases, etc. Mention the hour at which Storms, including Thunder and Lightning, began and ended.		Days of Month.									
		9 h. A.M.		9 h. P.M.		Protected in Shade, 4 feet above Ground.		Exposed Black Bulbs.		9 h. A.M.		9 h. P.M.		No. of hours in which it fell.	Amount in inches.	9 h. A.M.		9 h. P.M.		Readings of the H. Cup Anemometer.	9 A.M.		P.M.		9 h. A.M.															
		Barometer. No. _____	Attached Ther- mometer No. _____	Barometer. No. _____	Attached Ther- mometer No. _____	Max. No. _____	Min. No. _____	Max. in Sun-rays No. _____	Min. on Grass. No. _____	Dry bulb. No. _____	Wet bulb. No. _____	Dry bulb. No. _____	Wet bulb. No. _____			Direction.	Force.	Direction.	Force.		Velocity (0-5) and Direction.	Amount (0-10), and Species.	Velocity (0-5) and Direction.	Amount (0-10), and Species.	No. 3 inches.	No. 12 inches.						No. 22 inches.								
																																	No. _____	No. _____	No. _____	No. _____	No. _____	No. _____	No. _____	No. _____
																																	Inches.	°	Inches.	°	°	°	°	°
1	30.240	52.	30.260	56.	53.0	51.0			50.2	48.4	50.0	40.0	0.04	NE	1	NE	1															1								
2	30.355	52.	30.425	52.	54.0	45.2			49.8	46.8	47.0	43.5	0.00	E	1	E	1															2								
3	30.425	49.	30.360	52.	53.0	40.0			45.0	42.4	38.0	37.0	0.00	SE	1	S	1															3								
4	30.325	48.	30.310	47.	54.0	31.5			36.0	34.8	38.5	36.0	0.03	SW	1	SE	1															4								
5	30.250	53.	30.200	55.	55.5	24.0			37.0	35.5	36.5	35.0	0.07	SE	1	SW	1															5								
6	30.100	53.	30.040	56.	52.0	35.0			40.0	39.0	36.0	35.0	0.04	E	1	E	1															6								
7	29.975	48.	29.960	48.	50.5	33.0			41.2	40.0	42.2	40.0	0.03	NW	1	N	1															7								
8	29.960	49.	30.020	57.	57.0	39.5			45.2	44.0	44.0	41.8	0.08	SW	1	SW	1															8								
9	30.000	50.	29.990	57.	51.0	34.6			38.0	37.8	37.8	36.5	0.00	S	1	SW	1															9								
10					49.0	33.0							0.00	N		N																10								
11	Very incomplete being very unreliable.				50.0	36.8							0.00	SE		N																11								
12					54.0	38.0							0.07	SE		S																12								
13	29.889				56.0	44.0			50.0	48.0			0.22	S		S																13								
14	29.560				58.0	43.0			48.0	46.0			0.28	S		S																14								
15	28.689				56.0	47.0			51.0	47.0			0.02	S		SW																15								
16	29.700				46.0	33.0			46.0	46.0			0.20	N		N																16								
17	29.439				50.0	34.0			45.0	42.0			0.03	N		NW	2															17								
18	29.730	Very unreliable			48.0	33.0			38.0	37.0			0.00	NE		N	1																18							
19	29.861		29.749		48.0	28.0			46.0	44.0			0.05	NW		NW	1																19							
20	29.556				52.0	36.0							0.09	-		N																	20							
21	29.710				53.0	36.0			42.0	40.0			0.02	N	1	SW	1																21							
22	29.868		30.107		53.0	38.0			42.0	41.0			0.00	NW	1	N	1																22							
23	30.094		30.182		56.0	44.0			35.0	34.0			0.00	SW	1	SW	1																23							
24	30.047		30.195		58.0	37.0			47.0	47.0			0.22	SW	3	SW	2																24							
25	30.423				56.0	33.0			38.0	38.0			0.04	N	2	E	1																25							
26	29.675	53.	29.837		53.0	44.0			50.0	48.0			0.03	SW	2	NW	2																26							
27	30.090	52.	30.040	54.	50.0	44.0			46.0	42.0			0.00	NW	1	NW	1																27							
28	29.950	57.	29.925	52.	56.0	44.0			50.5	50.0			0.00	SW	1	SW	1																28							
29	29.850	63.	29.795	56.	57.6	48.0			52.2	52.0			0.00	SW	1	SW	1																29							
30	29.915	52.	30.050	53.	52.0	42.0			48.8	48.0			0.09	N	1	N	1																30							
31	29.870	51.	29.880	55.	61.0	38.0			57.0	57.0			0.01	S	1	SW	1																31							
Sums.					13	14							1.66																											
Means.					53.2	38.8																																		
+ Total Corrections for Instrumental Errors.																																								
+ Corrections for Diurnal Range.																																								
"Corrected Means."																																								
No. of Column.	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30										

BAROMETER, "corrected Mean" at 9 A.M., minus the Correction †† =

for Temp. (Col. 2), =

"Corrected Mean" of Barometer at 9 P.M., minus the Correction †† =

for Temp. (Col. 4), =

Mean at Station, corrected, and at 32° = 29.842

Correction for height, feet above Mean Sea-level, = 49

Mean, reduced to 32°, and Sea-level, = 29.841

Highest Reading, corrected for Index error, on the 3rd th, = 30.425

Lowest Do. Do., on the th, = 28.650

Difference, or Monthly Range, = 1.775

S.-R. THERMOMETER, (in shade, etc.), Highest in Month, (corrected for

Index Errors), on the 31st th, = 61.0Lowest in Month, corrected for Index errors, on the 19th, = 28.0

Difference, or Monthly Range, = 33.0

"Corrected Mean" of all the Highest, (Col. 5), = 53.2

"Corrected Mean" of all the Lowest, (Col. 6), = 38.8

Difference, or Mean Daily Range, = 14.4

** Calculated Mean Temperature of Month, = 46.0

S.-R. THERMOMETER, Black Bulb in Sun, Highest, (corrected for

Index Errors), on the th, =

"Corrected Mean," (Col. 7), of Black Bulb, Max. in Sun, =

Lowest at Night, Black Bulb (corrected for Index errors), on the th, =

"Corrected Mean," (Col. 8), of Black Bulb, Min. on grass, =

Difference of above means or range ("exposed"), =

HYGROMETER, Mean (corrected) A.M. and P.M. Reading of Dry

Bulb, (Cols. 9 and 11), = 45.6

Mean (corrected) A.M. and P.M. Reading of Wet Bulb, (Cols.

10 and 12), = 43.7

†† Computed Temperature of Dew-Point, = 41.5

†† Do. Elastic Force of Vapour, = 1263

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

†† Relative Humidity (Saturation = 100), = 86

RAIN fell on 20 Days; Amount in Inches, = 1.66

WIND.		SUMMARY.					
Direction.		N	NE	E	SE	S	SW
A.M.							
P.M.							
Mean.		3	2	2	3	3	6

* Each instrument tested at the Office in Edinburgh bears the stamp "S.M.S."; and a number to be entered in the Heading; or the Number and Initials of the Maker may be here given.
† Embracing corrections for both capillarity and Index Errors.
‡ The Diurnal Range for Scotland is as yet unknown.
§ These "Hygrometrical Deductions" are calculated from Glaisher's Hygrometrical Tables, Second Edition only.
|| While the Diurnal Range is unknown, the Arithmetic Mean of Cols. 5 and 6 will be entered as the "Calculated Mean Temperature."
Any observations not taken under the Conditions specified in the Directions on the other side, or noted at the Top of each column, must be marked as such by the observer, in each Schedule. See over.

Observations made and
Return verified by

(Signed)

Peter Haughey

SCOTTISH METEOROLOGICAL SOCIETY.

Observations taken at Wuthie Park, Aberdeenshire, County of Aberdeenshire, in Lat. 57° 9' N, Long 2° 6' W, Distance from Sea 2 miles.Height of Cistern of the Barometer above Mean Sea-Level 44 feet, above Ground 4 feet.During the MONTH of November 1902.

The Hours of Observation are of Greenwich Time.

ELECTRICITY.	Days of Month.	BAROMETER.				SELF-REGISTERING THERMOMETERS. Read Daily, at 9 P.M.				HYGROMETER.				Rain.		WIND.				CLOUDS.				THERMOMETERS under Ground.			SEA.	OZONE.		GENERAL REMARKS.		Days of Month.				
		9 h. A.M.		9 h. P.M.		Protected in Shade, 4 feet above Ground.		Exposed Black Bulbs.		9 h. A.M.		9 h. P.M.		No. of hours in which it fell.	Amount in inches.	9 h. A.M.		9 h. P.M.		Readings of the H. Cup Anemometer.	9 A.M.		P.M.		9 h. A.M.			0-10.		As to occurrence of Thunder, Lightning, Storms, Hail, Meteors, Remarkable Depression or Elevation of Barometer, Prevalent Diseases, etc. Mention the hour at which Storms, including Thunder and Lightning, began and ended.						
		Barometer. * No.	Attached Thermometer.	Barometer. No.	Attached Thermometer.	Max. No.	Min. No.	Max. in Sun's rays No.	Min. on Grass. No.	Dry bulb.	Wet bulb.	Dry bulb.	Wet bulb.			Direction.	Force.	Direction.	Force.		No.	Amount (0-10), and Species.	Velocity (0-5) and Direction.	Amount (0-10), and Species.	Velocity (0-5) and Direction.	Amount (0-10), and Species.		No. 3 inches.	No. 12 inches.		No. 22 inches.		Temperature of WELL at depth of feet, No.	Temperature at 1 fathom, and Depth.	9 A.M.	P.M.
1	29.810	57.	30.100	50.	52.0	47.0		50.5	50.0				0.00	W	3	W	3														fine breezy day	1				
2	30.230	48.	30.175	52.	49.0	32.6		38.2	27.5				0.00	SW	1	SW	1															fair white frost	2			
3	29.900	57.	30.100	57.	49.4	39.0		47.8	47.4				0.04	W	1	W	1															fair dull all day	3			
4	30.105	50.	29.900	50.	50.0	35.0		46.2	45.9				0.09	S	1	SE	2															slight rain fair after noon	4			
5	29.878	48.	29.750	50.	52.0	45.0		48.0	47.0				0.02	SE	2	SE	2															rain in fair later	5			
6	29.380	53.	29.640	52.	54.0	48.0		49.6	49.0				0.70	S	1	SE	1															fair all day	6			
7	29.350	53.	29.425	54.	52.2	48.4		57.0	50.5				0.04	SE	2	S	2															rain to 2 P.M. then fair	7			
8	29.457	52.	29.100	52.	50.0	38.0		48.9	47.2				0.43	SE	1	S	2															fair to 3 P.M. then some hard	8			
9	28.995	52.	29.400	54.	51.0	43.0		46.6	46.2				0.00	SW	2	SW	1															few showers fair after 7 P.M.	9			
10	29.650	49.	29.675	57.	50.4	39.0		48.0	46.0				0.00	SW	1	SW	1															fair & fine	10			
11	29.750	48.	29.600	52.	51.0	38.6		49.0	48.5				0.38	S	1	E	2															fine rain after 7 P.M.	11			
12	29.575	50.	29.700	53.	52.0	45.5		47.2	46.8				0.05	SW	2	S	1															fair & fine	12			
13	29.840	53.	29.805	53.	52.6	46.0		51.0	49.0				0.00	S	2	S	2															do do	13			
14	30.310	50.	30.350	52.	51.0	37.0		47.0	45.0				0.00	SW	1	SW	1															do do	14			
15	30.350	57.	30.340	53.	51.5	39.8		50.8	49.0				0.00	S	1	S	2															large fair dry dull	15			
16	30.340	52.	30.350	50.	51.4	46.0		47.0	46.0				0.14	S	2	S	2															dull dry fair	16			
17	30.460	57.	30.500	54.	51.6	42.2		46.0	45.0				0.00	S	2	S	1															fair dull all day	17			
18	30.520	52.	30.530	53.	52.4	42.0		45.2	42.5				0.00	S	2	S	2															do do	18			
19	30.450	47.	30.401	50.	44.2	41.0		43.0	40.0				0.00	SE	2	SE	2															do do	19			
20	30.420	48.	30.400	50.	45.2	41.0		43.2	40.0				0.00	SE	1	SE	1															fair & fine	20			
21	30.395	46.	30.190	50.	45.6	39.8		43.6	40.8				0.00	SE	1	SW	1															do do	21			
22	30.000	47.	29.500	50.	43.0	42.0		42.6	40.0				0.00	S	2	SW	1															do do	22			
23	29.725	48.	29.750	40.	43.6	37.8		40.5	38.5				0.00	SW	1	SW	1															do do	23			
24	29.700	44.	29.555	41.	47.4	28.2		30.2	29.5				0.06	SW	1	SW	2															fair white frost	24			
25	29.495	46.	29.500	48.	47.0	38.0		47.0	46.0				0.39	SE	1	SE	2															rain most of day	25			
26	29.500	48.	29.530	50.	48.0	45.5		47.0	46.5				0.04	S	2	S	1															fair dull	26			
27	29.555	48.	29.450	50.	48.0	42.0		45.5	44.8				0.00	SW	1	S	1															fair dull	27			
28	29.275	57.	29.240	57.	48.2	44.5		47.6	45.6				0.13	SE	2	SE	3															fair rain after 6 P.M.	28			
29	29.450	48.	29.655	40.	47.8	41.0		42.4	41.0				0.05	S	1	S	3															fair fine some rain P.M.	29			
30	29.830	50.	29.875	46.	45.0	41.2		45.0	44.0				0.00	SE	1	SE	3															dull cold unsettled	30			
31																																				
Sums.		1524	13	1493	6	116	166		158	148			256																							
Means.		29.818	291	29.886	12	27.5	32.1		174	136				44		49																				
+ Total Corrections for Instrumental Errors.		-0.070		-0.070																																
+ Corrections for Diurnal Range.																																				
"Corrected Means."		29.850		29.853																																
No. of Column.		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30					

BAROMETER, "corrected Mean" at 9 A.M., minus the Correction \ddagger for Temp. (Col. 2), = 29.793
"Corrected Mean" of Barometer at 9 P.M., minus the Correction \ddagger for Temp. (Col. 4), = 29.794
Mean at Station, corrected, and at 32°, = 29.793
Correction for height, feet above Mean Sea-level, = 50
Mean, reduced to 32°, and Sea-level, = 29.823
Highest Reading, corrected for Index error, on the 18th, = 30.540
Lowest Do. Do., on the 9th, = 28.985
Difference, or Monthly Range, = 1.555

S.-R. THERMOMETER, (in shade, etc.), Highest in Month, (corrected for Index Errors), on the 13th, = 54.6
Lowest in Month, corrected for Index errors, on the 24th, = 28.2
Difference, or Monthly Range, = 26.4
"Corrected Mean" of all the Highest, (Col. 5), = 49.2
"Corrected Mean" of all the Lowest, (Col. 6), = 41.0
Difference, or Mean Daily Range, = 8.2
** Calculated Mean Temperature of Month, = 45.1

S.-R. THERMOMETER, Black Bulb in Sun, Highest, (corrected for Index Errors), on the th, =
"Corrected Mean," (Col. 7), of Black Bulb, Max. in Sun, =
Lowest at Night, Black Bulb (corrected for Index errors), on the th, =
"Corrected Mean," (Col. 8), of Black Bulb, Min. on grass, =
Difference of above means or range ("exposed"), =

HYGROMETER, Mean (corrected) A.M. and P.M. Reading of Dry Bulb, (Cols. 9 and 11), = 45.7
Mean (corrected) A.M. and P.M. Reading of Wet Bulb, (Cols. 10 and 12), = 43.8
†† Computed Temperature of Dew-Point, = 41.3
†† Do. Elastic Force of Vapour, = 1.261
†† Do. Weight of Vapour in a Cubic Foot of Air, =
†† Relative Humidity (Saturation = 100), = 85
RAIN fell on 14 Days; Amount in Inches, = 2.56

WIND.	SUMMARY.									
	Direction.	N	NE	E	SE	S	SW	W	NW	Calm or Variable.
A.M.		0	0	0	9	10	8	2	0	0
P.M.		0	1	1	8	11	8	1	0	0
Mean.		0	1	0	9	11	8	1	0	0

Observations made and
Return verified by

(Signed)

Peter Harper

SCOTTISH METEOROLOGICAL SOCIETY.

Observations taken at Arthur Park Gardens, County of Aberdeen, in Lat. 57° 9' N, Long. 2° 6' W, Distance from Sea 3 miles.

Height of Cistern of the Barometer above Mean Sea-Level 44 feet, above Ground 4 feet.

During the MONTH of December 1902.

The Hours of Observation are of Greenwich Time.

ELECTRICITY.	Days of Month.	BAROMETER.				SELF-REGISTERING THERMOMETERS. Read Daily, at 9 P.M.				HYGROMETER.				Rain.		WIND.				CLOUDS.				THERMOMETERS under Ground.			SEA.	OZONE.	GENERAL REMARKS. As to occurrence of Thunder, Lightning, Storms, Hail, Meteors, Remarkable Depression or Elevation of Barometer, Prevalent Diseases, etc. Mention the hour at which Storms, including Thunder and Lightning, began and ended.	Days of Month.																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																
		9 h. A.M.		9 h. P.M.		Protected in Shade, 4 feet above Ground.		Exposed Black Bulbs.		9 h. A.M.		9 h. P.M.		No. of hours in which it fell.	Amount in inches.	9 h. A.M.		9 h. P.M.		Readings of the H. Cup Anemometer. No. ——— 9 h. A.M.	9 A.M.		P.M.		SUNSHINE. Hours.	9 h. A.M.																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																				
		Barometer. * No. ——— inches.	Attached Ther- mometer No. ——— °	Barometer. No. ——— inches.	Attached Ther- mometer No. ——— °	Max. No. ——— °	Min. No. ——— °	Max. in Sun's rays No. ——— °	Min. on Grass. No. ——— °	Dry bulb. No. ——— °	Wet bulb. No. ——— °	Dry bulb. No. ——— °	Wet bulb. No. ——— °			Direction.	Force.	Direction.	Force.		Velocity (0—6) and Direction.	Amount (0—10), and Species.	Velocity (0—6) and Direction.	Amount (0—10), and Species.		No. ——— 3 inches.					No. ——— 12 inches.	No. ——— 22 inches.																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																														

BAROMETER, "corrected Mean" at 9 A.M., minus the Correction for Temp. (Col. 2), = 40.1

"Corrected Mean" of Barometer at 9 P.M., minus the Correction for Temp. (Col. 4), = 45.1

Mean at Station, corrected, and at 32°, = 817

Correction for height, feet above Mean Sea-level, = 5.0

Mean, reduced to 32°, and Sea-level, = 29.867

Highest Reading, corrected for Index error, on the 4 th, = 30.640

Lowest Do. Do., on the 29 th, = 28.425

Difference, or Monthly Range, = 2.215

S.-R. THERMOMETER, (in shade, etc.), Highest in Month, (corrected for Index Errors), on the 7 th, = 55.0

Lowest in Month, corrected for Index errors, on the 7 th, = 25.0

Difference, or Monthly Range, = 30.0

"Corrected Mean" of all the Highest, (Col. 5), = 44.0

"Corrected Mean" of all the Lowest, (Col. 6), = 35.1

Difference, or Mean Daily Range, = 8.9

** Calculated Mean Temperature of Month, = 39.6

S.-R. THERMOMETER, Black Bulb in Sun, Highest, (corrected for Index Errors), on the 7 th, = 55.0

"Corrected Mean," (Col. 7), of Black Bulb, Max. in Sun, = 55.0

Lowest at Night, Black Bulb (corrected for Index errors), on the 7 th, = 25.0

"Corrected Mean," (Col. 8), of Black Bulb, Min. on grass, = 25.0

Difference of above means or range ("exposed"), = 30.0

HYGROMETER, Mean (corrected) A.M. and P.M. Reading of Dry Bulb, (Cols. 9 and 11), = 39.6

Mean (corrected) A.M. and P.M. Reading of Wet Bulb, (Cols. 10 and 12), = 38.0

†† Computed Temperature of Dew-Point, = 35.9

†† Do. Elastic Force of Vapour, = 1211

†† Do. Weight of Vapour in a Cubic Foot of Air, = 87

†† Relative Humidity (Saturation = 100), = 87

RAIN fell on 17 Days; Amount in Inches, = 2.76

WIND.		SUMMARY.			
Direction.		N	NE	E	SE
A.M.		1	2	0	6
P.M.		0	4	0	6
Mean.		1	3	0	6

Observations made and
Return verified by

(Signed)

INSTRUCTIONS

FOR TAKING METEOROLOGICAL OBSERVATIONS.

WITH REMARKS ON THE USE OF INSTRUMENTS.

ONE of the chief objects that the SCOTTISH METEOROLOGICAL SOCIETY proposed to itself when the Society was established in 1855, was to secure PERFECT UNIFORMITY in the system of observation pursued at all its Stations. Uniformity in the observations is absolutely necessary to justify the publication of Monthly Results from different observations, it being found that differences between the Returns from two Stations, so very considerable as to render them quite incomparable, may arise from dissimilarity in the position or shelter of instruments, different hours of observation, or even from the use of differently constructed instruments. It is therefore hoped, that those who kindly furnish Reports to the Society will, by a scrupulous attention to the following Directions, secure for their Monthly Returns an accuracy and value commensurate with the labour and pains involved in making them; and, for the Tables published by the Society, an entire comparableness among the several Returns, without which the Society's Reports must inevitably fail in achieving one of the main objects of Meteorological Observation.

The Council recommend that Observations be made precisely at 9 A.M. and 9 P.M. (Greenwich or Railway Time only), of the columns of the Schedule. It is hoped that the utmost punctuality in the time of reading the instruments will be observed. Observers, in some few cases, may find this impossible; in such instances they are specially requested to mark opposite every reading the time at which it was taken, if not at 9 A.M. or 9 P.M. Weather-glasses and Aneroids, though well suited to indicate roughly variations of atmospheric pressure, are not fitted for scientific purposes. No Barometer should be used for Meteorological Observation that is not supplied with some means of adjustment or compensation which will secure that the height of the mercury in the tube is accurately measured from the fluctuating surface of the mercury in the cistern.

The Barometer in which the error arising from the fluctuating surface of the mercury in the cistern is entirely got rid of is FORSTNER'S Barometer; the arrangement consisting in applying pressure by means of a screw to the bottom of the cistern, which is made of flexible leather; thus raising or depressing the surface till it just meets the ivory point which forms the zero point of the fixed scale. The Barometer originally constructed by Mr. Adie of London, and usually called the Board of Trade Barometer, has the great convenience of requiring no adjustment of the cistern. Its scale-inches are not true inches, but so much shorter as to compensate the error that would otherwise arise from the fluctuations of the surface of mercury in the cistern. This is an excellent Barometer for ordinary Observers, inasmuch as it entirely eliminates the error of observation likely to arise in a few cases in setting the instrument to the zero point of the fixed scale when the light is not good. To show the accuracy with which these Barometers are made, it may be stated, that one was compared, during a whole year, with the Society's Standard Barometer, particular care being given to make the comparison when atmospheric pressure was rising or falling very rapidly, with the result that none of the readings differed from those of the Standard more than 0.003 inch.

A modification of Forstner's Barometer is used at a number of the Society's Stations, by which the coincidence of the zero point with this surface of the mercury is indicated by a little ivory foot, whose stem passes freely through the lid and case of the cistern. When the surface of the mercury is brought, by the adjusting screw, to the zero point of the fixed scale, the ivory foot, which is graduated, is then at the exact height from which the scale is graduated. In taking an observation, this preliminary setting will vitiate the readings from the vernier.

It is absolutely necessary that the Barometer which is to be used shall have been compared with a Standard Barometer.

The Barometer should be suspended in as good a light as can be secured, and to facilitate the reading a piece of white paper may be put behind the tube. It must be hung truly perpendicular, and exposed to neither the sun's direct rays nor the heat of a fire, and must not be hung against a wall heated by a fire. The object being to secure that the whole instrument, including the brass fittings, the contained mercury, and the attached Thermometer, shall be, when read at one uniform temperature, it is evident that the best position is that which is least liable to sudden changes of temperature.

In taking an Observation, the Attached Thermometer is first noted; the tube must then be gently tapped, and the cistern-adjustment carefully made. The eye by raising and lowering it, must be brought into the plane of the back and front of the index—usually the lower edge of the vernier, which must be carefully adjusted so as to form a truly a tangent to the convex surface of the mercury in the tube. Observations must be taken quickly, so as to prevent heat from the observers' hands and person from affecting the mercury. The use of a lens will facilitate an accurate adjustment and reading of the Barometer. A mistake not unfrequently made by those beginning to observe, consisting in setting the edge of the vernier to the level of the clear surface of the mercury which is in direct contact with the glass tube, must be carefully avoided.

The errors most frequently made in reading the Barometer are errors of 1.000 inch, 0.050 inch, and 0.050 inch; that is to say, instead of 29.365 inches, either of the following is sometimes set down—viz. as 30.365 inches, 29.365 inches, or 29.815 inches. Experience having shown that even the very best Observers make these mistakes, particular attention is directed to the matter. When a Barometer having adjustable surfaces has to be removed from its fastenings, the ivory foot must first be screwed so as to form a tight plug to the cistern, thus preventing the escape of the mercury. The screw up the cistern must be turned so that the ivory foot is within a quarter of an inch of it, and take down the instrument; it should then be carried with the cistern uppermost. Before suspending the Barometer for use, it must be ascertained whether the space above the mercury in the tube is a complete vacuum; this is the case if, on inclining the instrument, a sharp tap is produced when the mercury strikes the top of the tube. If a dull tap is heard, there is air in the tube, which must be got rid of.

As Barometers are liable to be damaged by the introduction of air into their tubes, on removal from place to place, or in being roughly handled, it may be useful to Observers to know how the air may be expelled. First close up the cistern by screwing the ivory peg tight, so as to prevent the escape of the mercury; then screw up the mercury to about half an inch from the top of the tube, and having slowly inverted the instrument, place the top of it on a yielding substance, such as the book and gently tap on the cistern with the palm of the hand so as to induce the air to ascend through the column to the cistern, whence it may escape. Since there is the weight of two atmospheres—the pressure of the mercury in the Barometer and the air outside—passing on any air that may be inside the tube, it is usually a tedious operation to get it wholly expelled. After repeated trials, however, it is generally accomplished; and the clear metallic sound of the mercury, when gently struck against the top of the glass tube, will show when the whole of the air has been expelled. On hanging up the Barometer, care must be taken to screw down the mercury in the tube before unscrewing the float of the cistern, for, if this be not attended to, the mercury will flow out, and the instrument be seriously damaged.

The Council of the Society recommend that the Self-Registering Thermometers, and the Dry and Wet Bulb Hygrometers, be kept in Stevenson's Louver-boarded Box for protection to the weather, as shown in the past by repeated and annoying breakages of Thermometers of similar construction; and as regards Maximum Thermometers, either Negretti and Zambra's, or Phillips's, whether they will act at the highest temperatures they may be required to register. By the laws of the Society, Members and Observers have a right to have their instruments compared by the Secretary, and to advise with him regarding the purchase of instruments. Very great care should be bestowed on the Observations of the wind.

Wind, the accuracy of which, both as regards Direction and Force, is so essential towards the right discussion of many of the more important problems of the science. A Wind Vane ought to be elevated at least 12 feet above surrounding objects. When it oscillates incessantly, the mean direction should be taken. In all cases, but especially when the Vane is stationary, and when the wind is feeble, reference may be made to the direction of smoke, etc., in well-exposed situations. Careful observations are recommended to be made on the changes in the direction of the wind; and during storms, extra observations at every hour of Greenwich time. Such a system of simultaneous observation, pursued at different Stations, is likely to give highly valuable and important results, particularly in connection with the system of thickly-planted Stations, over a limited district round Edinburgh called STORM STATIONS, in the course of being established by the Society for the systematic investigation of the relation of the force of the wind to BAROMETRIC GRADIENTS, and other points connected with storms.

The Council would recommend the Hemispherical Cup Anemometer, over glass, a self-registering instrument which shows the amount of Wind that passes in per day; from which also the mean Velocity of the Wind at the time of observation may be ascertained. For indicating the Force of the Wind at any particular hour of observation, the Pressure Anemometers recently brought under the notice of the Society by Mr. T. Stevenson, the Honorary Secretary, and Mr. R. Ballingall, the Society's Observer at Larkhall, are recommended as likely to secure uniformity in making observations on the Force of the Wind.

Many causes conspire to produce anomalies in Rain Returns, arising partly from the difficulty of obtaining a perfectly unobstructed situation for observation, and partly from the defective nature of the instruments used. The Rain Gauge should not be placed on a slope or terrace, but on a level piece of ground, in an open situation as the Observer can secure for it. As it is often difficult to obtain a position as free and unobstructed by surrounding objects as is desirable, care should be taken to place it at some distance from shrubs, trees, buildings, or other obstructions, at least as many feet from their base as they are in height. The more important directions towards which it is most desirable to have a free exposure, are, in the order of their importance, S.W., N.E., S.E., S., and W. The rain of the gauge must be perfectly level, and fixed so that it will remain level in all weathers, and be at a height of one foot above ground, over grass. In such gauges as Fleming's, which are furnished with a measuring-rod attached to a float, the rod ought to be fixed down, and the float rise to its height only at the time the instrument is read, it being found that a stem projecting above the rim of the gauge seriously interferes with the proper measurement of the Rain-fall. When a measuring-glass is used, care should be taken to hold it quite perpendicular. The Rain Gauge ought to be read daily at 9 A.M., and the reading entered in the Returns of the previous day. If the Gauge is read once a month, the reading is to be made on the first of the month, and the amount entered for the previous month.

Snow-falls may, for convenience, be registered in the rain columns, under the following conditions:—When a Snow-shower occurs, it should be noted in the 'Remarks,' and the letter S affixed to the depth of water received in Gauge. The depth of the snow must be measured in some open place where no drift is observed, and registered in addition to, and as a check upon, the indications of the Rain Gauge. For wind, rain, and snow, as indeed in every column, the Observer cannot be too careful to register observations only; and nothing that partakes of the nature of deduction or inference. Convenient abbreviations for the nomenclature of Clouds will be found on the other side. The amount of Cloud ought to be estimated from the greater or less obscuration of the sky overhead (i.e. within 20° or 30° of the zenith). The strata of Clouds that appear near the horizon are viewed obliquely; and thus, being unable to judge of their amount, we ought not to take them into account in the Clouds' column, though their appearance and changes may be noted among the Remarks. The amount of Cloud is entered from a scale of 0 to 10; thus, when the sky overhead is free from Clouds it is entered 0, when half-covered by Clouds, 5, wholly covered, 10, and so on.

Observations of the Clouds are made at 9 A.M. and at sunset, as illustrating the condition and currents of the upper and lower regions of the atmosphere. The entries in the schedule are to be made in the following manner:—Thus, in the column Velocity and Direction, 9, S.W. will indicate that the upper strata of Clouds travel with extreme velocity from S.W., and those in the lower regions from W., with one-third the speed of the former. Again, in the second Cloud column, an entry of $\frac{2}{4}$, st. will indicate that the higher regions are covered to the amount of 4-tenths with stratus Clouds; and that the sky is further obscured to the extent of 2-tenths by lower Clouds of the cumulo stratus kind.

Remarks on peculiar Clouds, accompanied with drawings, will assist materially in the development of a more exact nomenclature of Clouds, as well as throw light on the electrical, and other of the more obscure phenomena of Meteorology. The approximate number of Hours in which objects in the sun's rays cast shadows, should be entered in the proper sunshine column. As the germination and growth of crops and plants generally depend greatly on the temperature of the soil,—its underground amount and constancy,—the Council recommend that Observations in this interesting department be made at 9 A.M., by Thermometers permanently fixed in the soil, their bulbs being sunk to depths of 3, 12, and 22 inches, and the stems above ground protected from the sun's rays, and fitted with sloping tin collars, to prevent rain-water being conveyed to the bulbs by the stems or wooden frames.

A knowledge of the Temperature of the Sea is not only in itself, but in its relations to that of our island, a most important branch of Meteorology. The Council therefore recommend that the Temperature of the Sea be carefully taken by a properly constructed apparatus, from boats, or, if this be impracticable, from the ends of piers and rocks along the coast, where it is not influenced by that of river water, and as little influenced as possible by currents sweeping along the coast, and thus acquiring the temperature of the land, either greatly heated by the sun or cooled by nocturnal radiation. At or near the time of high

water, in cases where the observations cannot be taken daily, the observation may be made on the 5th, 15th, and 25th of each month. When convenient, extra Sea Observations might be taken for other and greater depths, noting always the Temperature of the Air, and the Hour of Observation. It is also very desirable that observations on the daily Maxima and Minima by Thermometers continuously immersed, be instituted at points along the coast, by the method proposed by Mr. T. Stevenson, and already commenced at Peterhead and Liverpool. The Temperature of the water at the bottom of Wells ought, when practicable, to be taken, both the depth of the Temperature well and of the water being noted.

The Paper is affixed by a pin to a board in the Thermometer Box, and the indications registered at 9 A.M. and 9 P.M. It is desired that these indications be registered in connection with the force and direction of the wind at the time of observation, in the following manner:—thus 3⁵—W., as an Ozone entry in the schedule will indicate that the Ozone paper is tinted as 3 on the scale, that the wind is from the N.W., and that its force on the scale 0—5 is 4, or blowing fresh.

correct numbering of the scale of every instrument; the rejection of Thermometers the frameworks of which are not likely to stand exposure to the weather, as shown in the past by repeated and annoying breakages of Thermometers of similar construction; and as regards Maximum Thermometers, either Negretti and Zambra's, or Phillips's, whether they will act at the highest temperatures they may be required to register. By the laws of the Society, Members and Observers have a right to have their instruments compared by the Secretary, and to advise with him regarding the purchase of instruments. Very great care should be bestowed on the Observations of the wind.

Wind, the accuracy of which, both as regards Direction and Force, is so essential towards the right discussion of many of the more important problems of the science. A Wind Vane ought to be elevated at least 12 feet above surrounding objects. When it oscillates incessantly, the mean direction should be taken. In all cases, but especially when the Vane is stationary, and when the wind is feeble, reference may be made to the direction of smoke, etc., in well-exposed situations. Careful observations are recommended to be made on the changes in the direction of the wind; and during storms, extra observations at every hour of Greenwich time. Such a system of simultaneous observation, pursued at different Stations, is likely to give highly valuable and important results, particularly in connection with the system of thickly-planted Stations, over a limited district round Edinburgh called STORM STATIONS, in the course of being established by the Society for the systematic investigation of the relation of the force of the wind to BAROMETRIC GRADIENTS, and other points connected with storms.

The Council would recommend the Hemispherical Cup Anemometer, over glass, a self-registering instrument which shows the amount of Wind that passes in per day; from which also the mean Velocity of the Wind at the time of observation may be ascertained. For indicating the Force of the Wind at any particular hour of observation, the Pressure Anemometers recently brought under the notice of the Society by Mr. T. Stevenson, the Honorary Secretary, and Mr. R. Ballingall, the Society's Observer at Larkhall, are recommended as likely to secure uniformity in making observations on the Force of the Wind.

Many causes conspire to produce anomalies in Rain Returns, arising partly from the difficulty of obtaining a perfectly unobstructed situation for observation, and partly from the defective nature of the instruments used. The Rain Gauge should not be placed on a slope or terrace, but on a level piece of ground, in an open situation as the Observer can secure for it. As it is often difficult to obtain a position as free and unobstructed by surrounding objects as is desirable, care should be taken to place it at some distance from shrubs, trees, buildings, or other obstructions, at least as many feet from their base as they are in height. The more important directions towards which it is most desirable to have a free exposure, are, in the order of their importance, S.W., N.E., S.E., S., and W. The rain of the gauge must be perfectly level, and fixed so that it will remain level in all weathers, and be at a height of one foot above ground, over grass. In such gauges as Fleming's, which are furnished with a measuring-rod attached to a float, the rod ought to be fixed down, and the float rise to its height only at the time the instrument is read, it being found that a stem projecting above the rim of the gauge seriously interferes with the proper measurement of the Rain-fall. When a measuring-glass is used, care should be taken to hold it quite perpendicular. The Rain Gauge ought to be read daily at 9 A.M., and the reading entered in the Returns of the previous day. If the Gauge is read once a month, the reading is to be made on the first of the month, and the amount entered for the previous month.

Snow-falls may, for convenience, be registered in the rain columns, under the following conditions:—When a Snow-shower occurs, it should be noted in the 'Remarks,' and the letter S affixed to the depth of water received in Gauge. The depth of the snow must be measured in some open place where no drift is observed, and registered in addition to, and as a check upon, the indications of the Rain Gauge. For wind, rain, and snow, as indeed in every column, the Observer cannot be too careful to register observations only; and nothing that partakes of the nature of deduction or inference. Convenient abbreviations for the nomenclature of Clouds will be found on the other side. The amount of Cloud ought to be estimated from the greater or less obscuration of the sky overhead (i.e. within 20° or 30° of the zenith). The strata of Clouds that appear near the horizon are viewed obliquely; and thus, being unable to judge of their amount, we ought not to take them into account in the Clouds' column, though their appearance and changes may be noted among the Remarks. The amount of Cloud is entered from a scale of 0 to 10; thus, when the sky overhead is free from Clouds it is entered 0, when half-covered by Clouds, 5, wholly covered, 10, and so on.

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Too much importance cannot be attached to the electric condition of the atmosphere in connection with terrestrial magnetism, barometrical, thermometrical, and meteorological phenomena generally. A proper Electrometer is, in truth, necessary to every complete meteorological observatory.

The Remarks column is unavoidably too narrow. Some of the most valuable Observations that can be taken are those for which no rules can be given nor hours assigned. The use of contractions ought, therefore, to be taken every advantage of, and a list of such as in general use is given at the foot of the column. Besides special and extraordinary Observations, great prominence ought to be given in this column to Prevalent Diseases, differences in character, colour, velocity, and direction between the Lower and Upper Strata of clouds, the Colour of the Sky, etc. Remarks ought to be made on the occurrence of Meteors, Auroræ Boreales, remarkable depressions, elevations, and fluctuations of the Barometer, Thunder-Storms, and remarkable falls of Snow, Hail, or Rain, the Hour of Storms of Wind commencing, attaining their maximum, and ending, as well as such Notes on Storms as have been limited at above. When lofty hills are in the vicinity of a Station, the Height of Clouds and of the Snow-line in winter should be recorded.

By the use of abbreviations, the state of the weather at 9 A.M. and 9 P.M. should be registered, either in two columns, otherwise uncoupled, or ruled off for the purpose, from the column of 'Remarks.' Observations in connection with the Periodic Return of the Seasons, possess not only great scientific value, but connection with are of considerable importance in connection with the Periodic Re-Agriculture, Horticulture, and Natural History. The Council would direct the special attention of Observers to the registration of such phenomena, so that the published Summaries may fairly represent the whole of Scotland. Observations ought to be confined to individual trees and shrubs; to particular species of birds, and, in the case of crops, to specified sorts reared from year to year on a selected piece of ground or farm. The Annual Table, published yearly in the Society's Journal, will indicate the species of plants and animals to which special attention is more particularly directed.

The Council recommend Observers, before purchasing new instruments, and in repairing old ones, to communicate with the Meteorological Secretary, in order that every instrument may be examined and improved before being used; and they consider it necessary that he should have full power to reject any instrument which, on being presented for comparison, does not afford him satisfaction.

(By Order)

A. B.

EDINBURGH.

FOREST TREES.	CROPS.	PLANTS.	FRUIT TREES.	SHRUBS, ETC.
Alder.	Barley.	Oats.	Apple.	Barberry.
Beech.	Wheat.	Peas.	Black Currant.	Broom.
Birch.	Barley.	Peas.	Cherry.	Hazel.
Birch.	Wheat.	Peas.	Gooseberry.	Hawthorn.
Birch.	Wheat.	Peas.	Lapwing.	Holly.
Birch.	Wheat.	Peas.	Plover.	Laburnum.
Birch.	Wheat.	Peas.	Sand Martin.	Lilac.
Birch.	Wheat.	Peas.	Starling.	Mazewort.
Birch.	Wheat.	Peas.	Swan.	Mountain Ash or Rowan.
Birch.	Wheat.	Peas.	Thorn.	Red Flowering Currant.
Birch.	Wheat.	Peas.	Willow.	Rhododendron Ponticum.
Birch.	Wheat.	Peas.	Yew.	Whin.

OBSERVATIONS IN CONNECTION WITH THE PERIODICAL RETURN OF THE SEASONS.

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

To the SECRETARY,

Scottish Meteorological Society,

122 George Street,

EDINBURGH.

BOOK POST.