SCOTTISH METEOROLOGICAL SOCIETY.

Observations taken at Duthie Park, Aberdeen, County of Aberdeen, During the MONTH of January 1909.

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.

Diameter of Rain Gauge 5" inches. Height of Rim of Gauge above Ground 12 inches

The Hours of Observation are of Greenwich Time.

Days of Month.	BAROMETER. 9 A.M. Barometer. No.	9 A.M. Attached Thermometer	9 P.M. Barometer. No.	9 P.M. Attached Thermometer	SELF-REGISTERING THERMOMETERS, Read Daily, at 9 P.M. Protected in Screen, 4 feet above Ground. Max. No.	Min. No.	Black Bulb Max. in Sun. No.	Min. on Grass. No.	HYGROMETER. Dry No. ___ Wet No. ___ 9 A.M. Dry bulb.	9 A.M. Wet bulb.	9 P.M. Dry bulb.	9 P.M. Wet bulb.	RAIN. Amount at 9 A.M.	WIND. 9 A.M. Direction.	9 A.M. Force. Scale of 0—12.	9 P.M. Direction.	9 P.M. Force. Scale of 0—12.	Anemometer. 9 A.M.	CLOUDS. 9 A.M. Species and Direction.	9 A.M. Amount (0—10).	9 P.M. Species and Direction.	9 P.M. Amount (0—10).	SUNSHINE. Hours.	THERMOMETERS under Ground. 9 A.M. No. 3 ins.	No. 12 ins.	No. 22 ins.	No. 36 ins.	No. 48 ins.	GENERAL REMARKS. Occurrence of Snow, Hail, Thunder, Lightning, Fog, Gales, Meteors, Auroras, Remarkable Depression or Elevation of Barometer, etc. *Mention the hour at which Storms, including Thunder and Lightning, began and ended.*	Days of Month.
	inches.	°	inches.	°	°	°	°	°	°	°	°	°	inches.											°	°	°	°	°		
1	30.300	43	30.320	38.	45.0	29.2			41.4	40.6	43.0	44.0	0.00	S	4	SW.	2		Cu	8	Cu	8							Fair, been slight frost fair all day.	1
2	30.345	46.	30.345	48.	47.2	38.1			41.0	40.0	42.0	41.0	0.00	SW	2	SW	2		Ci	2	—								Rain, Fair & fine all day snow night	2
3	30.350	46.	30.400	50.	47.0	36.5			23.0	32.5	45.0	44.0	0.00	S	1	SW	1		—		Ci	8							Fair slight frost, very mild.	3
4	30.455	48.	30.420	46.	47.0	30.8			41.0	40.2	34.0	31.0	0.00	SW	2	SW	2		Ci	3	—							f.	Fair & very fine very mild, frost fog P.M.	4
5	30.410	45.	30.300	44.	42.2	26.6			29.2	29.0	41.0	39.0	0.00	SW	1	O	—		Ci	2	—								Fair, hard frost	5
6	30.315	45.	30.050	47.	42.4	28.5			34.8	34.0	40.0	39.0	0.06	SW	2	SW	2		Cu	3	Cu	10							Fair & very mild slight frost	6
7	29.800	45	29.700	46.	38.2	29.0	×		38.0	35.4	38.0	37.0	0.11	W	6	N	4		Ci	10	Ci	4						sl.	Fair dull, some rain and sleet, fine P.M.	7
8	29.650	43.	30.100	46.	38.0	32.0			35.8	34.0	36.0	34.5	0.15	NW.	6	NW	6		Cu	8	Cu	6						* .	Stormy snow shower all day.	8
9	30.050	49.	29.750	46.	43.0	32.0			34.5	33.0	35.0	33.5	0.00	W	2	SW	2		Cu	8	Cu	8							Dull fair mild all day.	9
10	29.700	45.	29.400	48.	40.5	33.4			37.0	35.0	40.0	39.0	0.00	SW.	2	SW	3		Cu	8	Cu	5							Fair mild & fine all day clear P.M.	10
11	29.045	44.	29.100	46.	44.0	34.8			43.0	39.5	38.5	38.0	0.14 SSS	W	4	W	6		Ci	4	Cu	8						*	Fair, fresh breeze,	11
12	29.150	46.	29.600	46.	36.5	28.2			30.8	29.0	34.0	32.0	0.05	W	2	N.W	4		Cu	6	Cu	8						*	Some inches snow heavy all day & P.	12
13	29.225	42	28.700	41.	38.0	22.6			35.0	32.4	34.0	33.0	0.15 SSS	SW	4	SW	4		Cu	8	Cu	8						*	Fair dull, heavy rain then fair.	13
14	28.700	40	28.600	45.	40.0	30.8			35.6	33.6	34.5	33.0	0.52 SSS	SW	4	SW	2		Cu	6	Cu	8						*	More snow, rain evening.	14
15	28.700	41.	28.810	43.	40.0	31.0			34.8	32.0	38.0	34.0	0.00	W	6	SW	4		Cu	6	—							*	Wild snow showers, Fair & clear P. M.	15
16	28.950	40.	29.475	44.	40.6	25.0			26.0	25.0	27.0	26.0	0.02	SW	2	SW	4		—		—								Fair, hard frost clear P.M.	16
17	29.470	40.	29.475	44.	49.2	25.0			40.0	29.0	44.0	42.0	0.00	S	2	W	8		Ni	10	Ni	8						g	Frost some rain, gale from (P.M.	17
18	29.350	46	29.545	47.	49.0	39.0			47.5	45.0	46.0	44.0	0.12	S	2	S	2		Cu	10	—							g	Do to	18
19	29.750	47.	30.050	46	39.5	34.0			35.0	33.0	34.0	32.0	0.00	SW	2	SW	2		Cu	3	—								Fair v fine slight frost.	19
20	30.250	43.	30.350	44.	40.0	29.0			32.0	31.6	33.0	32.0	0.00	SW	2	SW	2		—		—								Do Do & P.M	20
21	30.345	42.	30.350	48.	43.0	28.5			34.0	33.6	35.0	34.0	0.05	S.W	2	SW	2		Cu	3	Cu	5							Do fair & fine frost P.M.	21
22	30.400	44.	30.325	45.	41.0	33.4			34.0	33.5	37.0	36.0	0.02	W	1	S	2		Cu	5	Cu	6							Fair mild slight frost rain P.M.	22
23	30.225	42.	30.200	44.	38.0	33.0			38.2	36.8	36.5	34.0	0.00	S	2	S	1		Cu	8	Cu	6							Fair mild, dull snow disappearing	23
24	30.125	45	30.175	47	37.6	32.0			34.8	32.7	34.0	32.0	0.00	SW	1	SW	1		Cu	6	Cu	6							Fair mild frost & fine all day	24
25	30.200	45.	30.245	46.	36.5	29.2			33.2	31.0	33.0	30.0	0.00	SW	2	SW	2		Cu	6	—								Do slight frost all day P.M.	25
26	30.350	44.	30.400	48.	42.0	29.0			30.6	30.2	32.0	30.0	0.00	SW	2	SW	2		Cu	3	—								Do Do.	26
27	30.400	44.	30.325	47	40.0	28.6			35.5	34.0	34.0	32.5	0.00	SW	2	SW	2		Cu	6	—								Do Do	27
28	30.200	43.	30.000	47.	40.4	29.9			33.9	31.5	35.0	33.0	0.00	SW	1	SW	1		haze	10	haze	10						f	Fair slight frost, fair all day.	28
29	29.925	44.	29.875	47.	42.8	30.0			38.0	35.0	33.0	30.0	0.08 SSS	W	2	NW	6		Cu	3	Cu	6						sl.	Fair, sleet showers P.M.	29
30	30.100	41	30.050	47	34.0	27.2			32.0	29.0	33.0	32.0	0.09 SSS	NW	8	NW	4		Cu	8	Ni	10						g. *	Very stormy showers of snow all day	30
31	29.950	43	29.825	46	38.0	30.4			32.0	32.0	32.0	31.0	0.0 SSS	NW	2	NW	6		Cu	10	Cu	8						*.	Slight Showers. Snow. Fair after 11 A.m	31
Sums.	894	12	1275	17	134	168			1388	1261	1211	1111	5				83					73								
	27.245	164	27.320	177	394	107			172.6	112.5	198.5	152.5	1.59				91					146								
Means.	29879	440	29831	45.7	41.3	30.3			35.6	33.6	36.4	34.9			2.1		2.9			5.6		4.7								
Corrections for Instrumental Errors.						+1.0																								
Corrections for Diurnal Range.																														
Corrected Means																														

$ 10
$ 0 0
$ 7
0 4
8 2
9 3

NOTATION USED IN GENERAL REMARKS.

a. *denotes* aurora.
d. ,, drizzling rain.
f. ,, fog.
fr. ,, frost.
h.-fr. ,, hoar-frost.
h. ,, haze.
hl. ,, hail.
l. ,, lightning.
lu. co. ,, lunar corona.
lu. ha. ,, lunar halo.
m. ,, mist.
p. ,, passing showers.
r. ,, rain.
r.² ,, heavy rain.
sl. ,, sleet.
sn. ,, snow.
so. ha. ,, solar halo.
q. ,, squall.
q.² ,, violent squalls.
t. ,, thunder.
t. s. ,, thunder-storm.

CLOUDS.

HIGH CLOUDS.
Cirrus, ... cir.
Cirro-stratus, . . cir.-str.
Cirro-cumulus, . . cir.-cum.

MIDDLE CLOUDS.
Strato-cirrus, . . str.-cir.
Cumulo-cirrus, . . cum.-cir.

LOWER CLOUDS.
Strato-cumulus, . . str.-cum.
Cumulus, . . . cum.
Cumulo-nimbus, . . cum.-nim.
Nimbus, . . . nim.
Stratus, ... str.

BEAUFORT SCALE FOR ESTIMATING FORCE OF WIND—(0—12).

FORCE.		FORCE.		FORCE.	
0	Calm.	5	Fresh Breeze.	9	Strong Gale.
1	Light Air.	6	Strong Breeze.	10	Whole Gale.
2	Light Breeze.	7	Moderate Gale.	11	Storm.
3	Gentle Breeze.	8	Fresh Gale.	12	Hurricane.
4	Moderate Breeze.				

BAROMETER. Corrected Mean at 9 A.M., *minus* Correction for Temp. = —.41 = 29.838

Corrected Mean at 9 P.M., *minus* Correction for Temp. = —.45 = 29.836

Mean at Station, corrected, and at 32°, = 29.837

Correction for height, feet above Mean Sea-level, = + .050

Mean, reduced to 32°, and Sea-level, = .887

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

Lowest Do. Do., on the th, =

Difference, or **Monthly Range,** =

S.-R. THERMOMETER, (in shade) **Highest in Month,** corrected for Index Errors, on the 17 th, 18 = 49

Lowest in Month, corrected for Index errors, on the 13 th, = 23

Difference, or **Monthly Range,** = 26

Mean of all the Highest, = 41.3

Mean of all the Lowest, = 30.3

Difference, or **Mean Daily Range,** = 10.0

Mean Temperature of Month, ½ (Mean Max. + Mean Min.), = 36.3

S.-R. THERMOMETER, Min. on Grass, Lowest in Month, =

,, ,, Mean, =

Black Bulb, Max. in Sun, Highest in Month, =

HYGROMETER, Dry Bulb, Mean of A.M. and P.M. Readings, = 36.0

Wet Bulb, Mean of A.M. and P.M. Readings, = 34.3

Computed **Temperature of Dew-Point,** =

Do. **Elastic Force of Vapour,** = .180

Do. **Relative Humidity** (Saturation = 100), = 85%

RAIN fell on 14 **Days; Amount in Inches,** = 1.59

WIND. SUMMARY. Direction.	N	NE	E	SE	S	SW	W	NW	Calm or Variable.	Mean Force 0—12.
A.M.					5	16	7	3		2.7
P.M.	1				3	19	7	5	1	2.9
Sum.	1	0	0	0	8	35	9	8	1	2.8

Observations made and Return verified by Peter Harper

(*Signed*)

N.B.—**Rain** to be measured at 9 A.M. and the amount entered to the previous day.

See instructions on back of Schedule.

INSTRUCTIONS FOR TAKING METEOROLOGICAL OBSERVATIONS.

In order to insure uniformity in the observations made at the Observing Stations of the Scottish Meteorological Society, the Council request the Observers to adopt the methods described below.

HOURS OF OBSERVATION.

The Council recommend that Observations be made precisely at 9 A.M. and 9 P.M. (Greenwich Time). At both hours the Barometer and Dry and Wet Bulb Thermometers should be read, and notes made of the Wind, Cloud, and general weather. The Rain Gauge should be read at 9 A.M. only, and the Maximum and Minimum Self-registering Thermometers at 9 P.M. only.

It is hoped that every effort will be made to insure punctuality. When, however, an observation is taken not at the usual hours, it is requested that this be stated in a note on the Schedule.

All instruments used should be compared with a certified standard; Observers are requested to communicate with the Secretary before purchasing new or repairing old instruments.

BAROMETER.

The Barometer should be hung in a good light and in a room not exposed to sudden changes of temperature. The upper part of the scale must not be higher than the level of the observer's eye, and the instrument must hang vertically. Barometers should not be moved from their places except by persons accustomed to the work, as they are very liable to get air into the mercury column when improperly handled. Mercurial barometers mounted in metal cases are the only sort suitable for the accurate measurement of atmospheric pressure.

FORTIN BAROMETER.—In setting this instrument the level of the mercury in the glass cistern has first to be adjusted by turning the screw below the cistern till the surface of the mercury just touches the ivory point which projects downwards from the cover of the cistern. A modification of the Fortin pattern is used at several of the Society's Stations, in which the adjustment is made by turning the screw until the zero line on an ivory rod which projects through the cover of the cistern is brought to coincide with the lines on the uprights beside it. In either pattern this cistern adjustment must be made before the Vernier at the top of the mercury column is set.

In the BOARD OF TRADE pattern of barometer no adjustment of the cistern is required, and the Observer can at once proceed to set the Vernier, which in all three classes of instrument is done as follows:—

First see that the Vernier is raised above the mercury, then lower it till its front and back edge both just touch, that is, form a tangent to, the highest part of the mercury column. The top of the mercury is usually slightly convex, and care must be taken not to bring the Vernier down to where the front of the mercury touches the glass, which is below the real top of the column.

The attached thermometer should be read and noted before setting the barometer, as its readings may be affected by heat from the Observer's body while handling the instrument.

The errors most frequently made in reading the barometer are mistakes of 1·000 inch, 0·100 inch, and 0·050 inch; that is to say, instead of 29·365 one of the following is sometimes set down—viz. 30·365, 29·265, or 29·315. Experience having shown that even the best Observers occasionally make these mistakes, the reading, after it is writen down, should be compared again with the scale.

STEVENSON SCREEN.

The Maximum, Minimum, Dry Bulb, and Wet Bulb Thermometers should be placed in a louvred Stevenson Screen standing over grass and with its door facing north. The Dry and Wet Bulb Thermometers may be conveniently attached to upright laths near the front of the Screen, and the Maximum and Minimum Thermometers to others farther back. The height of the Screen should be such that the bulbs of the Dry and Wet Thermometers are four feet above the ground. The Screen should be painted white inside and out.

MAXIMUM AND MINIMUM THERMOMETERS.

In order that the MAXIMUM THERMOMETER may register the highest temperature of the day, the column of mercury is disconnected from the mercury in the bulb either by an air-bubble in the column (Phillip's pattern), or by the narrowing of the tube near the bulb (Negretti and Zambra's pattern). In either case the instrument is set by holding it vertically, bulb downwards, and gently shaking and tapping it so as to send the portion of the column that remained at the highest point attained back towards the bulb.

The MINIMUM THERMOMETER registers the lowest temperature by an index enclosed in the column of spirit which is drawn towards the bulb as the temperature falls, but remains stationary during any rise of temperature. The lowest reading is therefore the position of the end of the index furthest from the bulb. The instrument is set by inclining it bulb upwards till the index slips down to the end of the column of spirit. Care must be taken not to force any part of the index beyond the end of the spirit. Should this occur, however, or should portions of the spirit get detached and lodge in the upper part of the tube, it is generally possible to set the instrument right again by grasping it near the end furthest from the bulb and giving several rapid vertical swings at arm's length, so as to drive the spirit and index towards the bulb by centrifugal force.

Both Maximum and Minimum should be read and set at 9 P.M. The readings should be written down before the Thermometers are touched; and after setting, both should agree very nearly with the Dry Bulb temperature at that hour. Any difference from the Dry Bulb of more than a degree may be regarded by the Observer as an indication either that the instrument is not properly set, or that it is out of order.

DRY AND WET BULB THERMOMETERS.

The Hygrometer in use at the Society's Stations consists of two thermometers—a Dry and a Wet Bulb—of similar form, and usually mounted on one frame. The bulbs should project at least an inch from the frame, and the Wet Bulb be covered with muslin and connected by strands of cotton with the water cistern. This cistern should be placed an inch or two below the level of the bulbs and at the side of the Wet Bulb furthest from the Dry Bulb; it should not stand directly under the Wet Bulb. Muslins and strands are supplied to most stations from the Society's office, and should be renewed at least once a month. In putting on a fresh muslin care should be taken to touch it as little as may be with the fingers. In frosty weather the strands do not convey water to the muslin, but an accurate observation can generally be insured by soaking the Wet Bulb in water a quarter of an hour before the observation, as from the film of ice thus formed on the muslin evaporation goes on in the same way as from the wet muslin under ordinary circumstances.

RAIN GAUGE.

The Rain Gauge should be read at 9 A.M. each day, and the amount entered to the *previous day on the Schedule*: thus the quantity measured at 9 A.M. on the 5th should be put down on the line containing the observations of the 4th of the month, since out of the twenty-four hours ending at 9 A.M. on 5th, fifteen belong to the 4th and only nine to the 5th, so that the amount may more properly be credited to the former day. The monthly total for, say, January is thus what falls between 9 A.M. on 1st January and 9 A.M. on 1st February.

The measuring glass is divided to hundredths of an inch—the highest line indicating ·50, that is fifty hundredths or half an inch. The amount should be entered on the Schedule thus: if up to say the sixth line in the glass as ·06, if up to the twenty-third line as ·23, if up to the thirtieth line as ·30, and so on, there being always two figures put down to the right of the decimal point. Care should be taken to avoid entering ·08 as simply 8, or ·30 as ·3, as this may cause confusion when adding the figures to get the total for the month.

When the fall exceeds one fill of the measuring glass it is necessary to measure it in portions, and each successive reading should be jotted down on the flyleaf of the note-book or other convenient place before the glass is emptied. Thus after heavy rain the amounts measured might be:—

·47
·42
·38
———
1·27

The total, 1·27, would be entered on the Schedule.

The glass must be held vertically or placed on a level surface when reading. A little uncertainty is sometimes caused by the upward curvature of the water where it touches the side of the glass, but the true reading is half way between the two apparent edges of the water surface. When there is nothing in the gauge a stroke (——) should be entered on the Schedule rather than the figure 0.

Snow or **Hail** is counted as Rainfall, and should be melted and measured as such. The upper part of the gauge may be taken indoors, and what is lying in it thawed. To save time, especially if snow or rain be then falling, it is convenient to add a measured quantity of warm water to the snow in the gauge, this quantity being afterwards deducted from the total to get the amount that has fallen. The depth of snow lying on the ground should be noted in the Remarks column.

In gauges, such as Flemings, in which a float and measuring rod is used, the rod should be removed or tied down below the level of the rim, except when a measurement is being taken, because if allowed to project above the gauge, it would prevent it catching the true amount of fall.

If a gauge is only read once a month this should be done on the morning of the 1st, and the amount entered to the previous month.

The Rain Gauge should be placed in an open situation, if possible with no elevated objects close to it, in any case trees, walls, etc., should never be nearer to the gauge in horizontal distance than their own height. The gauge should be firmly fixed with its rim 12 inches above ground; if surrounded by grass, care must be taken that it is never allowed to grow as high as the rim. The gauges at most Stations are five inches in diameter, though a few of larger or smaller size are also in use. A convenient way of fixing a gauge in position is to drive four stout wooden pegs from 12 to 18 inches long into the ground, one at each side of the gauge.

WIND, CLOUD, SUNSHINE, ETC.

WIND.

The direction and force of the Wind should be noted at 9 A.M. and 9 P.M. In confined situations where the true direction cannot be easily observed, it is best to ascertain this by watching the movement of smoke from chimneys, or even of the lower clouds. The force of the wind should be noted according to the scale given on the other side of the Schedule.

At Stations where an Anemometer is in use, the readings at 9 A.M. each day should be put down in the column provided, the values being entered to the previous day, as in the case of the Rainfall.

CLOUDS.

The amount of Cloud should be estimated on the scale, 0 to 10, 0 indicating a clear and 10 an overcast sky. Only the part of the sky over 30° above the horizon should be taken into account, as it is impossible to estimate the space covered by Clouds nearer the horizon. A convenient table for noting briefly the species of Cloud will be found on the other side of the Schedule. It is desirable to note, if possible, the direction from which the Clouds are moving. If there is more than one layer of clouds on the sky, they should be noted.

Thus, for example,

Cir. W. . .	4
Cum. Str. S.W.	2

would indicate that four-tenths of the sky was covered with cirrus moving from the West, and two-tenths with cumulus moving from the S.W.

SUNSHINE.

This column is primarily for those Stations where a Sunshine Recorder is kept; at other Stations, however, the Observer may note in it the number of hours each day that the sun shines with sufficient clearness to cast a distinct shadow.

RADIATION THERMOMETERS.

A MAXIMUM THERMOMETER, with its bulb blackened and enclosed in an outer glass bulb exhausted of air, is used at many stations to register the highest temperature in the sun. It should be mounted horizontally about four feet above ground with its bulb pointing south, and should be read and set at 9 P.M.

A MINIMUM THERMOMETER on grass is used to register the lowest radiation temperature at night. It should be placed on wooden supports a few inches above the surface of the grass. It may be read and set at 9 P.M., but in warm weather, as the spirit in this instrument is liable to evaporate when exposed to bright sunshine and to condense again in the upper part of the tube, it is better to read it at 9 A.M., to put it inside the screen during the day, and to set and replace it at 9 P.M.

THERMOMETERS UNDER GROUND.

These should be read at 9 A.M., and the readings entered on the day on which they are made.

REMARKS.

In the Remarks column should be noted all occurrences of Snow, Hail, or Heavy Rain; of Thunder, or Lightning, or both together; of all Auroras, Meteors, or Halos round the sun or moon; Fogs, Gales or Storms, and generally of all noteworthy Weather phenomena.

The table and additional lines on the back of the Schedule are for the use of those Observers who wish to record Notes connected with the changes of the Seasons, such as the growth of Crops, Fruit, etc., and the migrations of Birds; also the prevalence of Diseases in man, in the lower animals, and in plants. Such observations are often of great interest and utility when taken in conjunction with the ordinary Meteorological records.

DATES IN CONNECTION WITH THE PERIODICAL RETURN OF THE SEASONS.

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

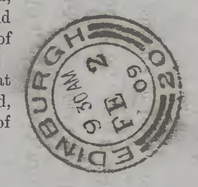
SHRUBS, ETC.	First in Blossom.	FRUITS.	First in Blossom.	Fruit Ripe, generally.	MIGRATORY BIRDS.	First Arrival.	Departure.
Barberry,		Apple,			Cuckoo,		
Bourtree or Elder,		Black Currant,			Curlew,		
Broom,		Cherry,			House-Swallow,		
Hazel,		Gean,			Lapwing,		
Hawthorn,		Gooseberry,			Plover,		
Holly,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

The Society will be glad to receive any portions of the information indicated in this table that may come under the Observer's notice.

ADDITIONAL REMARKS.

THE SECRETARY,
Scottish Meteorological Society,
122 *George Street,*
EDINBURGH.

BOOK POST.



SCOTTISH METEOROLOGICAL SOCIETY.

Observations taken at Duthie Park Aberdeen, County of Aberdeen, During the MONTH of February 1909.

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.

Diameter of Rain Gauge 5 inches. Height of Rim of Gauge above Ground 12 inches on grass

The Hours of Observation are of Greenwich Time.

Days of Month.	BAROMETER. 9 A.M. Barometer. No.	9 A.M. Attached Thermometer	9 P.M. Barometer. No.	9 P.M. Attached Thermometer	SELF-REGISTERING THERMOMETERS, Read Daily, at 9 P.M. Protected in Screen, 4 feet above Ground. Max. No.	Min. No.	Black Bulb Max. in Sun. No.	Min. on Grass. No.	HYGROMETER. Dry No. ___ Wet No. ___ 9 A.M. Dry bulb.	9 A.M. Wet bulb.	9 P.M. Dry bulb.	9 P.M. Wet bulb.	RAIN. Amount at 9 A.M.	WIND. 9 A.M. Direction.	9 A.M. Force. Scale of 0—12.	9 P.M. Direction.	9 P.M. Force. Scale of 0—12.	Anemometer. 9 A.M.	CLOUDS. 9 A.M. Species and Direction.	9 A.M. Amount (0—10).	9 P.M. Species and Direction.	9 P.M. Amount (0—10).	SUNSHINE. Hours.	THERMOMETERS under Ground. 9 A.M. No. 3 ins.	No. 12 ins.	No. 22 ins.	No. 36 ins.	No. 48 ins.	GENERAL REMARKS. Occurrence of Snow, Hail, Thunder, Lightning, Fog, Gales, Meteors, Auroras, Remarkable Depression or Elevation of Barometer, etc. *Mention the hour at which Storms, including Thunder and Lightning, began and ended.*	Days of Month.
	inches.	°	inches.	°	°	°	°	°	°	°	°	°	inches.											°	°	°	°	°		
1	29.900	46	30.045	45	37.8	32.0			36.0	34.8	37.0	35.0	0.03	NW	4	NW	2		Cu	6	Cu	6							Fresh & fair all day	1
2	29.775	45	29.675	45	46.0	36.2			38.0	36.2	40.0	39.0	0.00	SW	2	SW	2		Cu	10	Ci	8							slight frost, mild fresh all day	2
3	29.700	48	29.395	46	47.0	36.8			46.0	45.0	42.4	40.3	0.02	W	2	W	2		Ci	10	Ci	4							clear frost slight rain, fresh & fine	3
4	29.520	47	29.505	48	44.2	36.0			39.0	36.6	37.0	35.5	0.00	SW	2	SW	2		Ci	4	Ci	6							Slight frost. fair o/nite. mild p.m.	4
5	29.600	46	29.900	47	47.0	32.0			38.8	36.8	40.0	37.0	0.03	NW	4	NW	4		Ci	8	Ci	4							Been slight rain o/night, fine p.m.	5
6	30.100	45	30.050	47	42.5	35.5			36.5	35.2	37.0	36.0	0.02	NW	2	S	2		Ci	2	—								Fair slight frost, clear p.m.	6
7	31.000	42	30.050	46	40.0	25.0			29.0	28.0	30.0	27.0	0.00	SW	1	S	6		Ci	4	Cu	8							Fair hard white frost. Fair all day	7
8	30.030	44	29.950	47	40.3	27.5			36.2	34.8	35.5	35.0	0.04	S	4	S	4		Cu	10	—								Dull fair. clear p.m.	8
9	29.600	44	29.300	46	40.5	34.0			35.5	34.0	36.0	35.0	0.15	NW	4	NW	2		Cu	10	Cu	8							* Dull sleet rain. heavy p.m.	9
10	29.350	43	29.600	46	40.4	33.0			37.0	36.4	35.0	33.0	0.00	NW	2	NE	2		N	10	Ci	10							* Dull. been snow showers. Fair all day	10
11	30.030	45	30.306	45	41.2	35.8			37.0	33.0	35.6	35.0	0.00	NE	2	S.E	2		Ci	10	N	10							Dull clear cold all day.	11
12	30.500	45	30.450	43	37.8	34.0			35.4	33.6	36.5	34.5	0.00	E	2	E	2		Ci	8	Ci	8							Do Do	12
13	30.533	41	30.350	43	48.0	26.1			29.0	27.6	40.0	38.5	0.02	SE	1	S	1		—		Ci	6							Fair white frost, continuing all day.	13
14	30.250	46	30.150	49	51.5	31.0			43.0	39.8	41.0	36.0	0.00	SW	1	SW	2		Ci	8	Ci	2							Do Do	14
15	30.125	46	30.200	47	42.0	33.0			40.0	37.0	38.5	35.8	0.03	NW	6	NW	2		Cu	10	Ci	4							Stormy, cold wind, damp. Clear p.m.	15
16	30.135	46	30.140	48	42.1	33.0			38.0	35.0	36.0	34.0	0.00	NW	2	SW	2		Ci	4	Ci	6							Slight frost. cool. Mild p.m.	16
17	30.025	49	29.950	48	44.0	33.4			36.0	34.5	41.3	39.2	0.00	SW	2	SW	2		Ci	5	Ci	6							Fair and very fine mild.	17
18	29.900	46	29.975	49	48.2	33.8			36.5	35.0	35.0	33.0	0.00	SW	2	SW	2		Ci	5	—								Do Do, frost p.m.	18
19	30.030	46	30.100	47	44.0	29.0			36.5	34.5	38.5	37.0	0.00	SW	2	SW	4		—		—								Cold white frost, clear p.m.	19
20	30.225	46	30.270	48	47.8	31.0			33.0	31.4	40.0	38.0	0.00	SW	2	SW	2		—		—								Do Do	20
21	30.320	45	30.360	45	46.0	33.0			38.0	36.8	38.0	36.0	0.00	SW	2	SW	1		—		—								white frost, bright sunshine. Clear p.m.	21
22	30.375	46	30.452	49	49.5	33.0			40.9	37.0	46.5	46.0	0.02	SW	2	SW	4		Ci	5	Ci	8							Do. slight rain then fair	22
23	30.450	46	30.450	50	46.1	36.2			43.0	41.0	41.5	41.0	0.07	N	2	N	2		Ci	8	Ci	6							very fine, mild. Dull p.m.	23
24	30.400	49	30.475	48	46.2	38.4			39.0	36.2	44.0	39.0	0.04	SE	2	S	2		N	10	Ci	10							Dull, slight rain. fair after noon	24
25	30.525	48	30.575	49	39.0	35.6			37.0	34.5	36.5	34.0	0.00	SE	2	E	2		Ci	10	Ci	10							Dull fair, mild o/nite all day	25
26	30.575	46	30.500	48	41.6	35.4			37.4	33.8	37.0	35.0	0.02	N	2	N	2		Ci	10	Ci	10							Do Do	26
27	30.350	46	30.175	48	42.5	34.6			38.0	36.0	37.0	36.5	0.06	NW	2	NW	2		N	10	N	10							Some rain, dull cool, rain evening	27
28	30.000	45	29.975	42	42.4	33.0			35.8	34.0	36.0	34.5	0.04	NW	2	N	4		Cu	8	Ci	8							* Been snow shower, fair from noon. Cold p.m.	28
29																														29
30																														30
31																														31
Sums.	1084	15	2·253	89	127·6	87·3			175	149	124	153	0·53				65		68		18		158							
	2·125	157							255	148·2	225·8	175·8																		
Means.	30·079	45·6	30·080	46·8	43·8	33·1			37·3	35·3	38·1	36·3					2·3		2·4		6·7		5·6							
Corrections for Instrumental Errors.						+1·0																								
Corrections for Diurnal Range.																														
Corrected Means																														

S 3
a 0 0
d 0 4
f 0 8 0
fg

NOTATION USED IN GENERAL REMARKS.

a. *denotes* aurora.
d. ,, drizzling rain.
f. ,, fog.
fr. ,, frost.
h.-fr. ,, hoar-frost.
h. ,, haze.
hl. ,, hail.
l. ,, lightning.
lu. co. ,, lunar corona.
lu. ha. ,, lunar halo.
m. ,, mist.
p. ,, passing showers.
r. ,, rain.
r.² ,, heavy rain.
sl. ,, sleet.
sn. ,, snow.
so. ha. ,, solar halo.
q. ,, squall.
q.² ,, violent squalls.
t. ,, thunder.
t. s. ,, thunder-storm.

CLOUDS.

HIGH CLOUDS.
Cirrus, ... cir.
Cirro-stratus, . . . cir.-str.
Cirro-cumulus, . . . cir.-cum.

MIDDLE CLOUDS.
Strato-cirrus, . . . str.-cir.
Cumulo-cirrus, . . . cum.-cir.

LOWER CLOUDS.
Strato-cumulus, . . . str.-cum.
Cumulus, ... cum.
Cumulo-nimbus, . . . cum.-nim.
Nimbus, ... nim.
Stratus, ... str.

BEAUFORT SCALE FOR ESTIMATING FORCE OF WIND—(0—12).

FORCE.		FORCE.		FORCE.	
0	Calm.	5	Fresh Breeze.	9	Strong Gale.
1	Light Air.	6	Strong Breeze.	10	Whole Gale.
2	Light Breeze.	7	Moderate Gale.	11	Storm.
3	Gentle Breeze.	8	Fresh Gale.	12	Hurricane.
4	Moderate Breeze.				

BAROMETER. Corrected Mean at 9 A.M., *minus* Correction for Temp. = —.46 = 30·033

Corrected Mean at 9 P.M., *minus* Correction for Temp. = —.49 = 30·031

Mean at Station, corrected, and at 32°, = 30·032

Correction for height, feet above Mean Sea-level, = + .50

Mean, reduced to 32°, and Sea-level, = 30·082

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

Lowest Do. Do., on the th, =

Difference, or **Monthly Range,** =

S.-R. THERMOMETER, (in shade) **Highest in Month,** corrected for Index Errors, on the 14 th, = 52

Lowest in Month, corrected for Index errors, on the 7 th, = 26

Difference, or **Monthly Range,** = 26

Mean of all the Highest, = 43·8

Mean of all the Lowest, = 34·1

Difference, or **Mean Daily Range,** = 9·7

Mean Temperature of Month, ½ (Mean Max. + Mean Min.), = 38·0

S.-R. THERMOMETER, Min. on Grass, Lowest in Month, =

,, ,, Mean, =

Black Bulb, Max. in Sun, Highest in Month, =

HYGROMETER, Dry Bulb, Mean of A.M. and P.M. Readings, = 37·7

Wet Bulb, Mean of A.M. and P.M. Readings, = 35·8

Computed **Temperature of Dew-Point,** =

Do. **Elastic Force of Vapour,** = 190

Do. **Relative Humidity** (Saturation = 100), = 83

RAIN fell on 14 **Days; Amount in Inches,** = 0·53

WIND. SUMMARY. Direction.	N	NE	E	SE	S	SW	W	NW	Calm or Variable.	Mean Force 0—12.
A.M.	2	1	1	3	1	10	19			23
P.M.	3	1	2	1	5	10	1	5		24
Sum.	5	2	3	4	6	20	2	14	0	24

Observations made and Return verified by Peter Harper

(*Signed*) .....

N.B.—**Rain** to be measured at 9 A.M. and the amount entered to the previous day.

See instructions on back of Schedule.

INSTRUCTIONS FOR TAKING METEOROLOGICAL OBSERVATIONS.

In order to insure uniformity in the observations made at the Observing Stations of the Scottish Meteorological Society, the Council request the Observers to adopt the methods described below.

HOURS OF OBSERVATION.

The Council recommend that Observations be made precisely at 9 A.M. and 9 P.M. (Greenwich Time). At both hours the Barometer and Dry and Wet Bulb Thermometers should be read, and notes made of the Wind, Cloud, and general weather. The Rain Gauge should be read at 9 A.M. only, and the Maximum and Minimum Self-registering Thermometers at 9 P.M. only.

It is hoped that every effort will be made to insure punctuality. When, however, an observation is taken not at the usual hours, it is requested that this be stated in a note on the Schedule.

All instruments used should be compared with a certified standard; Observers are requested to communicate with the Secretary before purchasing new or repairing old instruments.

BAROMETER.

The Barometer should be hung in a good light and in a room not exposed to sudden changes of temperature. The upper part of the scale must not be higher than the level of the observer's eye, and the instrument must hang vertically. Barometers should not be moved from their places except by persons accustomed to the work, as they are very liable to get air into the mercury column when improperly handled. Mercurial barometers mounted in metal cases are the only sort suitable for the accurate measurement of atmospheric pressure.

FORTIN BAROMETER.—In setting this instrument the level of the mercury in the glass cistern has first to be adjusted by turning the screw below the cistern till the surface of the mercury just touches the ivory point which projects downwards from the cover of the cistern. A modification of the Fortin pattern is used at several of the Society's Stations, in which the adjustment is made by turning the screw until the zero line on an ivory rod which projects through the cover of the cistern is brought to coincide with the lines on the uprights beside it. In either pattern this cistern adjustment must be made before the Vernier at the top of the mercury column is set.

In the BOARD OF TRADE pattern of barometer no adjustment of the cistern is required, and the Observer can at once proceed to set the Vernier, which in all three classes of instrument is done as follows:—

First see that the Vernier is raised above the mercury, then lower it till its front and back edge both just touch, that is, form a tangent to, the highest part of the mercury column. The top of the mercury is usually slightly convex, and care must be taken not to bring the Vernier down to where the front of the mercury touches the glass, which is below the real top of the column.

The attached thermometer should be read and noted before setting the barometer, as its readings may be affected by heat from the Observer's body while handling the instrument.

The errors most frequently made in reading the barometer are mistakes of 1·000 inch, 0·100 inch, and 0·050 inch; that is to say, instead of 29·365 one of the following is sometimes set down—viz. 30·365, 29·265, or 29·315. Experience having shown that even the best Observers occasionally make these mistakes, the reading, after it is writen down, should be compared again with the scale.

STEVENSON SCREEN.

The Maximum, Minimum, Dry Bulb, and Wet Bulb Thermometers should be placed in a louvred Stevenson Screen standing over grass and with its door facing north. The Dry and Wet Bulb Thermometers may be conveniently attached to upright laths near the front of the Screen, and the Maximum and Minimum Thermometers to others farther back. The height of the Screen should be such that the bulbs of the Dry and Wet Thermometers are four feet above the ground. The Screen should be painted white inside and out.

MAXIMUM AND MINIMUM THERMOMETERS.

In order that the MAXIMUM THERMOMETER may register the highest temperature of the day, the column of mercury is disconnected from the mercury in the bulb either by an air-bubble in the column (Phillip's pattern), or by the narrowing of the tube near the bulb (Negretti and Zambra's pattern). In either case the instrument is set by holding it vertically, bulb downwards, and gently shaking and tapping it so as to send the portion of the column that remained at the highest point attained back towards the bulb.

The MINIMUM THERMOMETER registers the lowest temperature by an index enclosed in the column of spirit which is drawn towards the bulb as the temperature falls, but remains stationary during any rise of temperature. The lowest reading is therefore the position of the end of the index furthest from the bulb. The instrument is set by inclining it bulb upwards till the index slips down to the end of the column of spirit. Care must be taken not to force any part of the index beyond the end of the spirit. Should this occur, however, or should portions of the spirit get detached and lodge in the upper part of the tube, it is generally possible to set the instrument right again by grasping it near the end furthest from the bulb and giving several rapid vertical swings at arm's length, so as to drive the spirit and index towards the bulb by centrifugal force.

Both Maximum and Minimum should be read and set at 9 P.M. The readings should be written down before the Thermometers are touched; and after setting, both should agree very nearly with the Dry Bulb temperature at that hour. Any difference from the Dry Bulb of more than a degree may be regarded by the Observer as an indication either that the instrument is not properly set, or that it is out of order.

DRY AND WET BULB THERMOMETERS.

The Hygrometer in use at the Society's Stations consists of two thermometers—a Dry and a Wet Bulb—of similar form, and usually mounted on one frame. The bulbs should project at least an inch from the frame, and the Wet Bulb be covered with muslin and connected by strands of cotton with the water cistern. This cistern should be placed an inch or two below the level of the bulbs and at the side of the Wet Bulb furthest from the Dry Bulb; it should not stand directly under the Wet Bulb. Muslins and strands are supplied to most stations from the Society's office, and should be renewed at least once a month. In putting on a fresh muslin care should be taken to touch it as little as may be with the fingers. In frosty weather the strands do not convey water to the muslin, but an accurate observation can generally be insured by soaking the Wet Bulb in water a quarter of an hour before the observation, as from the film of ice thus formed on the muslin evaporation goes on in the same way as from the wet muslin under ordinary circumstances.

RAIN GAUGE.

The Rain Gauge should be read at 9 A.M. each day, and the amount entered to the *previous day on the Schedule*: thus the quantity measured at 9 A.M. on the 5th should be put down on the line containing the observations of the 4th of the month, since out of the twenty-four hours ending at 9 A.M. on 5th, fifteen belong to the 4th and only nine to the 5th, so that the amount may more properly be credited to the former day. The monthly total for, say, January is thus what falls between 9 A.M. on 1st January and 9 A.M. on 1st February.

The measuring glass is divided to hundredths of an inch—the highest line indicating ·50, that is fifty hundredths or half an inch. The amount should be entered on the Schedule thus: if up to say the sixth line in the glass as ·06, if up to the twenty-third line as ·23, if up to the thirtieth line as ·30, and so on, there being always two figures put down to the right of the decimal point. Care should be taken to avoid entering ·08 as simply 8, or ·30 as ·3, as this may cause confusion when adding the figures to get the total for the month.

When the fall exceeds one fill of the measuring glass it is necessary to measure it in portions, and each successive reading should be jotted down on the flyleaf of the note-book or other convenient place before the glass is emptied. Thus after heavy rain the amounts measured might be:—

·47
·42
·38
———
1·27

The total, 1·27, would be entered on the Schedule.

The glass must be held vertically or placed on a level surface when reading. A little uncertainty is sometimes caused by the upward curvature of the water where it touches the side of the glass, but the true reading is half way between the two apparent edges of the water surface. When there is nothing in the gauge a stroke (——) should be entered on the Schedule rather than the figure 0.

Snow or **Hail** is counted as Rainfall, and should be melted and measured as such. The upper part of the gauge may be taken indoors, and what is lying in it thawed. To save time, especially if snow or rain be then falling, it is convenient to add a measured quantity of warm water to the snow in the gauge, this quantity being afterwards deducted from the total to get the amount that has fallen. The depth of snow lying on the ground should be noted in the Remarks column.

In gauges, such as Flemings, in which a float and measuring rod is used, the rod should be removed or tied down below the level of the rim, except when a measurement is being taken, because if allowed to project above the gauge, it would prevent it catching the true amount of fall.

If a gauge is only read once a month this should be done on the morning of the 1st, and the amount entered to the previous month.

The Rain Gauge should be placed in an open situation, if possible with no elevated objects close to it, in any case trees, walls, etc., should never be nearer to the gauge in horizontal distance than their own height. The gauge should be firmly fixed with its rim 12 inches above ground; if surrounded by grass, care must be taken that it is never allowed to grow as high as the rim. The gauges at most Stations are five inches in diameter, though a few of larger or smaller size are also in use. A convenient way of fixing a gauge in position is to drive four stout wooden pegs from 12 to 18 inches long into the ground, one at each side of the gauge.

WIND, CLOUD, SUNSHINE, ETC.

WIND.

The direction and force of the Wind should be noted at 9 A.M. and 9 P.M. In confined situations where the true direction cannot be easily observed, it is best to ascertain this by watching the movement of smoke from chimneys, or even of the lower clouds. The force of the wind should be noted according to the scale given on the other side of the Schedule.

At Stations where an Anemometer is in use, the readings at 9 A.M. each day should be put down in the column provided, the values being entered to the previous day, as in the case of the Rainfall.

CLOUDS.

The amount of Cloud should be estimated on the scale, 0 to 10, 0 indicating a clear and 10 an overcast sky. Only the part of the sky over 30° above the horizon should be taken into account, as it is impossible to estimate the space covered by Clouds nearer the horizon. A convenient table for noting briefly the species of Cloud will be found on the other side of the Schedule. It is desirable to note, if possible, the direction from which the Clouds are moving. If there is more than one layer of clouds on the sky, they should be noted.

Thus, for example, | Cir. W. . . | 4 | / | Cum. Str. S.W. | 2 | would indicate

that four-tenths of the sky was covered with cirrus moving from the West, and two-tenths with cumulus moving from the S.W.

SUNSHINE.

This column is primarily for those Stations where a Sunshine Recorder is kept; at other Stations, however, the Observer may note in it the number of hours each day that the sun shines with sufficient clearness to cast a distinct shadow.

RADIATION THERMOMETERS.

A MAXIMUM THERMOMETER, with its bulb blackened and enclosed in an outer glass bulb exhausted of air, is used at many stations to register the highest temperature in the sun. It should be mounted horizontally about four feet above ground with its bulb pointing south, and should be read and set at 9 P.M.

A MINIMUM THERMOMETER on grass is used to register the lowest radiation temperature at night. It should be placed on wooden supports a few inches above the surface of the grass. It may be read and set at 9 P.M., but in warm weather, as the spirit in this instrument is liable to evaporate when exposed to bright sunshine and to condense again in the upper part of the tube, it is better to read it at 9 A.M., to put it inside the screen during the day, and to set and replace it at 9 P.M.

THERMOMETERS UNDER GROUND.

These should be read at 9 A.M., and the readings entered on the day on which they are made.

REMARKS.

In the Remarks column should be noted all occurrences of Snow, Hail, or Heavy Rain; of Thunder, or Lightning, or Both together; of all Auroras, Meteors, or Halos round the sun or moon; Fogs, Gales or Storms, and generally of all noteworthy Weather phenomena.

The table and additional lines on the back of the Schedule are for the use of those Observers who wish to record Notes connected with the changes of the Seasons, such as the growth of Crops, Fruit, etc., and the migrations of Birds; also the prevalence of Diseases in man, in the lower animals, and in plants. Such observations are often of great interest and utility when taken in conjunction with the ordinary Meteorological records.

DATES IN CONNECTION WITH THE PERIODICAL RETURN OF THE SEASONS.

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

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

The Society will be glad to receive any portions of the information indicated in this table that may come under the Observer's notice.

ADDITIONAL REMARKS.

THE SECRETARY,
Scottish Meteorological Society,
122 *George Street,*
EDINBURGH.

BOOK POST.

SCOTTISH METEOROLOGICAL SOCIETY.

Observations taken at Duthie Park Aberdeen, County of Aberdeen, During the MONTH of March 1909.

Lat. _____, Long. _____, Distance from Sea 2 miles. Height of Cistern of the Barometer above Mean Sea-Level 44 feet, above Ground 4 feet.

Diameter of Rain Gauge 5" inches. Height of Rim of Gauge above Ground 12 inches

The Hours of Observation are of Greenwich Time.

Days of Month.	BAROMETER. 9 A.M. Barometer. No.	9 A.M. Attached Thermometer	9 P.M. Barometer. No.	9 P.M. Attached Thermometer	SELF-REGISTERING THERMOMETERS, Read Daily, at 9 P.M. Protected in Screen, 4 feet above Ground. Max. No.	Min. No.	Black Bulb Max. in Sun. No.	Min. on Grass. No.	HYGROMETER. Dry No. ____ Wet No. ____ 9 A.M. Dry bulb.	9 A.M. Wet bulb.	9 P.M. Dry bulb.	9 P.M. Wet bulb.	RAIN. Amount at 9 A.M.	WIND. 9 A.M. Direction.	9 A.M. Force. Scale of 0—12.	9 P.M. Direction.	9 P.M. Force. Scale of 0—12.	Anemometer. 9 A.M.	CLOUDS. 9 A.M. Species and Direction.	9 A.M. Amount (0—10).	9 P.M. Species and Direction.	9 P.M. Amount (0—10).	SUNSHINE. Hours.	THERMOMETERS under Ground. 9 A.M. No. 3 ins.	No. 12 ins.	No. 22 ins.	No. 36 ins.	No. 48 ins.	GENERAL REMARKS. Occurrence of Snow, Hail, Thunder, Lightning, Fog, Gales, Meteors, Auroras, Remarkable Depression or Elevation of Barometer, etc. *Mention the hour at which Storms, including Thunder and Lightning, began and ended.*	Days of Month.
	inches.	°	inches.	°	°	°	°	°	°	°	°	°	inches.												°	°	°	°	°		
1	29.850	45	29.625	43	43.0	32.2			35.8	34.0	34.0	33.0	0.07	NW	4	W	2		N	8	N	10								*	Snow showers Cool Snow 10.30 a	1
2	29.445	45	29.350	43	42.5	33.0			35.6	34.6	34.0	32.5	0.06	NW.	4	N	4		N	8	N	6								*	Snow showers frequent all day + pm.	2
3	29.375	38	29.450	45	37.0	22.0			29.0	28.0	33.0	31.0	0.10	NW	2	NW	2		N	10	N	10								*	Snow from 8 AM Continuing all day	3
4	29.450	42	29.455	47	35.5	23.0			30.4	28.0	33.0	32.0	0.00	NW	2	NW	2		N	10	Ci	8									Frost; fair all day + pm	4
5	29.450	41	29.500	41	37.8	24.8			29.2	28.0	28.0	26.0	0.04	SW	2	SW	1		Ci	10	Ci	10								*	Been fair yesterday, now snowy 9 A.M.	5
6	29.500	38	29.475	43	32.6	20.0			24.0	23.0	26.0	25.0	0.10	W	4	E	4		Ci	6	N	10								*	Snow showers frequent all day	6
7	29.350	37	29.455	41	38.0	23.0			35.0	34.9	26.0	25.0	0.57	E	8	SE.	8		N	10	N	10								*	Sleet very bad morning + night	7
8	29.750	42	30.000	45	39.5	34.0			36.5	36.0	36.0	34.0	0.18	NE.	6	NE	6		N	10	N	10								*	Dull, damp, sleet showers.	8
9	30.025	43	30.030	43	38.0	35.0			37.0	35.0	36.0	35.0	0.10	NE.	6	NE	6		N	10	N	10								*	Do Do	9
10	30.090	43	30.120	43	37.0	34.5			38.0	36.0	34.5	34.0	0.20	NE.	6	NE.	6		N	10	N	10								*	Do Do	10
11	30.155	43	30.200	46	41.6	33.4			37.3	33.6	38.0	36.0	0.00	NE.	4	W.	4		Ci	8	—										Fair + fine all day. clear p.m.	11
12	30.025	44	30.050	45	44.0	31.0			40.0	38.0	36.0	34.0	0.00	W	2	NE.	2		Ci	8	Ci	5									Do. first part of day. Some cool showers	12
13	29.850	41	29.640	46	43.0	30.8			37.1	35.9	35.0	33.5	0.68	W	2	W	2		Ci	10	Ci	5									Fair dull, clearing evening.	13
14	29.500	41	29.300	43	38.0	31.0			34.0	32.0	34.0	33.5	0.06	NW	6	N	4		Cu	4	Cu	8								*	Snow showers (2 inch)	14
15	29.455	43	29.400	45	38.8	31.6			33.3	31.8	35.0	36.0	0.21	W	2	N	2		Cu	4	Ci	4								*	Snow all night; followed by clear day	15
16	29.500	43	29.500	46	36.4	30.0			32.8	29.6	35.0	33.5	0.05	N	2	N	2		Ci	4	Ci	3								*	Do Do	16
17	29.400	41	29.300	45	42.0	22.0			36.4	34.0	34.6	33.0	0.02	S	2	S	4		Ci	6	Cu	8									Fair + frosty A.M. Dull P.M.	17
18	29.250	45	29.225	46	44.0	33.1			40.0	39.6	41.6	40.0	0.21	S	2	S	2		Ci	8	Cu	8									Fair dull like rain. Rain p.m.	18
19	29.225	45	29.300	44	42.0	33.2			41.0	40.6	42.5	42.4	0.10	SE	4	SE.	2		N	10	N	10									Do Do	19
20	29.400	47	29.300	49	44.0	39.5			42.2	42.0	42.0	41.0	0.13	SE	2	SE.	2		N	10	N	10									Dull frequent rain, fairing in afternoon	20
21	29.505	49	29.530	51	48.0	39.0			41.0	40.5	43.0	42.0	0.07	SE.	2	SE	2		N	10	N	10									Fair dull + fine all day.	21
22	29.640	48	29.700	50	43.0	35.6			40.2	39.8	41.0	40.0	0.00	SE.	2	SE	2		N	10	Fog.										Fair dull, much fog p.m.	22
23	29.800	48	29.850	50	44.4	38.0			39.8	38.0	40.0	39.8	0.00	SE.	2	S	2		N	10	N	10									Do. Do. Clear p.m.	23
24	29.630	48	29.275	50	45.0	38.8			40.8	40.0	41.5	41.0	0.09	SE	2	SE	2		N	10	N	10									Do Do.	24
25	29.175	45	29.450	45	44.8	38.6			44.5	38.6	41.5	41.0	0.18	NE	6	N	5		N	10	—										Rain, fair afternoon + evening.	25
26	29.535	46	29.700	48	45.0	35.0			39.2	37.6	40.6	40.0	0.04	W	6	NW	4		Cu	5	—										Showers + sunshine, clear p.m.	26
27	29.730	47	29.700	46	46.5	38.8			41.4	38.3	38.0	37.4	0.12	W	2	SW	2		Ci	8	—										Fair + fine, clear frost p.m.	27
28	29.650	42	29.490	47	48.7	30.5			38.8	37.4	38.8	37.0	0.00	SW	2	SW	2		Ci	8	—										Do Do	28
29	29.290	45	29.270	46	39.0	30.6			39.0	38.0	38.0	37.0	0.33	NE	6	NE	6		N	10	N	10									Been heavy rain, dull all day.	29
30	29.270	48	29.460	48	39.0	37.0			38.0	37.5	39.0	36.5	0.55	NE	6	NE.	4		N	10	N	10									Been heavy rain, continuing all day.	30
31	29.600	44	29.800	43	41.8	35.8			39.8	37.0	37.3	36.0	0.82	NE	6	NE	6		N	10	Ci	10										Fair cool all day	31
Sums.	13125	14	1343	13	967	708			1591	1179	1245	1134	9				114		265		215											
	7930	117	1814.0	15	399	614.8			971	773	831	758	458				104															
Means.	29.578	43.8	29.385	45.6	41.33	32.1			37.0	35.7	36.6	35.4	✓		3.7		3.4		8.5		6.9											
Corrections for Instrumental Errors.						+1.0																										
Corrections for Diurnal Range.	−0.10		−0.10																													
Corrected Means																																

5	12											
4	0											
3	0											
2	0											
1	17											
0	2											
	1											

NOTATION USED IN GENERAL REMARKS.

a.	*denotes* aurora.	
d.	,,	drizzling rain.
f.	,,	fog.
fr.	,,	frost.
h.-fr.	,,	hoar-frost.
h.	,,	haze.
hl.	,,	hail.
l.	,,	lightning.
lu. co.	,,	lunar corona.
lu. ha.	,,	lunar halo.
m.	,,	mist.
p.	,,	passing showers.
r.	,,	rain.
r^2	,,	heavy rain.
sl.	,,	sleet.
sn.	,,	snow.
so. ha.	,,	solar halo.
q.	,,	squall.
q^2	,,	violent squalls.
t.	,,	thunder.
t. s.	,,	thunder-storm.

CLOUDS.

HIGH CLOUDS.

Cirrus,	cir.
Cirro-stratus,	cir.-str.
Cirro-cumulus,	cir.-cum.

MIDDLE CLOUDS.

Strato-cirrus,	str.-cir.
Cumulo-cirrus,	cum.-cir.

LOWER CLOUDS.

Strato-cumulus,	str.-cum.
Cumulus,	cum.
Cumulo-nimbus,	cum.-nim.
Nimbus,	nim.
Stratus,	str.

BEAUFORT SCALE FOR ESTIMATING FORCE OF WIND—(0—12).

FORCE.		FORCE.		FORCE.	
0	Calm.	5	Fresh Breeze.	9	Strong Gale.
1	Light Air.	6	Strong Breeze.	10	Whole Gale.
2	Light Breeze.	7	Moderate Gale.	11	Storm.
3	Gentle Breeze.	8	Fresh Gale.	12	Hurricane.
4	Moderate Breeze.				

BAROMETER. Corrected Mean at 9 A.M., *minus* Correction for Temp. = ... − 40 = 29.538

Corrected Mean at 9 P.M., *minus* Correction for Temp. = ... − 45 = 29.540

Mean at Station, corrected, and at 32°, ... = 29.539

Correction for height, feet above Mean Sea-level, ... = + .050

Mean, reduced to 32°, and Sea-level, ... = 29.589

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

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

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

S.-R. THERMOMETER, (in shade) **Highest in Month,** corrected for Index Errors, on the 28 th, ... = 49

Lowest in Month, corrected for Index errors, on the 6 th, ... = 21

Difference, or **Monthly Range**, ... = 28

Mean of all the Highest, ... = 41.3

Mean of all the Lowest, ... = 33.1

Difference, or **Mean Daily Range**, ... = 8.2

Mean Temperature of Month, ½ (Mean Max. + Mean Min.), ... = 37.2

S.-R. THERMOMETER, Min. on Grass, Lowest in Month, ... =

,, ,, Mean, ... =

Black Bulb, Max. in Sun, Highest in Month, ... =

HYGROMETER, Dry Bulb, Mean of A.M. and P.M. Readings, ... = 36.8

Wet Bulb, Mean of A.M. and P.M. Readings, ... = 35.6

Computed **Temperature of Dew-Point,** ..... =

Do. **Elastic Force of Vapour,** ..... = 195

Do. **Relative Humidity** (Saturation = 100), = 90

RAIN fell on 25 **Days; Amount in Inches,** ..... = 4.58

WIND. SUMMARY. Direction.	N	NE	E	SE	S	SW	W	NW	Calm or Variable.	Mean Force 0—12.
A.M.	3	8	1	6	2	2	4	5	0	3.7
P.M.	7	7	1	6	3	3	1	3	0	3.4
Sum.	10	15	2	12	5	5	5	8	0	3.5

Observations made and Return verified by Peter Harper

(Signed) _____

N.B.—**Rain** to be measured at 9 A.M. and the amount entered to the previous day.

See instructions on back of Schedule.

INSTRUCTIONS FOR TAKING METEOROLOGICAL OBSERVATIONS.

In order to insure uniformity in the observations made at the Observing Stations of the Scottish Meteorological Society, the Council request the Observers to adopt the methods described below.

HOURS OF OBSERVATION.

The Council recommend that Observations be made precisely at 9 A.M. and 9 P.M. (Greenwich Time). At both hours the Barometer and Dry and Wet Bulb Thermometers should be read, and notes made of the Wind, Cloud, and general weather. The Rain Gauge should be read at 9 A.M. only, and the Maximum and Minimum Self-registering Thermometers at 9 P.M. only.

It is hoped that every effort will be made to insure punctuality. When, however, an observation is taken not at the usual hours, it is requested that this be stated in a note on the Schedule.

All instruments used should be compared with a certified standard; Observers are requested to communicate with the Secretary before purchasing new or repairing old instruments.

BAROMETER.

The Barometer should be hung in a good light and in a room not exposed to sudden changes of temperature. The upper part of the scale must not be higher than the level of the observer's eye, and the instrument must hang vertically. Barometers should not be moved from their places except by persons accustomed to the work, as they are very liable to get air into the mercury column when improperly handled. Mercurial barometers mounted in metal cases are the only sort suitable for the accurate measurement of atmospheric pressure.

FORTIN BAROMETER.—In setting this instrument the level of the mercury in the glass cistern has first to be adjusted by turning the screw below the cistern till the surface of the mercury just touches the ivory point which projects downwards from the cover of the cistern. A modification of the Fortin pattern is used at several of the Society's Stations, in which the adjustment is made by turning the screw until the zero line on an ivory rod which projects through the cover of the cistern is brought to coincide with the lines on the uprights beside it. In either pattern this cistern adjustment must be made before the Vernier at the top of the mercury column is set.

In the BOARD OF TRADE pattern of barometer no adjustment of the cistern is required, and the Observer can at once proceed to set the Vernier, which in all three classes of instrument is done as follows:—

First see that the Vernier is raised above the mercury, then lower it till its front and back edge both just touch, that is, form a tangent to, the highest part of the mercury column. The top of the mercury is usually slightly convex, and care must be taken not to bring the Vernier down to where the front of the mercury touches the glass, which is below the real top of the column.

The attached thermometer should be read and noted before setting the barometer, as its readings may be affected by heat from the Observer's body while handling the instrument.

The errors most frequently made in reading the barometer are mistakes of 1·000 inch, 0·100 inch, and 0·050 inch; that is to say, instead of 29·365 one of the following is sometimes set down—viz. 30·365, 29·265, or 29·315. Experience having shown that even the best Observers occasionally make these mistakes, the reading, after it is writen down, should be compared again with the scale.

STEVENSON SCREEN.

The Maximum, Minimum, Dry Bulb, and Wet Bulb Thermometers should be placed in a louvred Stevenson Screen standing over grass and with its door facing north. The Dry and Wet Bulb Thermometers may be conveniently attached to upright laths near the front of the Screen, and the Maximum and Minimum Thermometers to others farther back. The height of the Screen should be such that the bulbs of the Dry and Wet Thermometers are four feet above the ground. The Screen should be painted white inside and out.

MAXIMUM AND MINIMUM THERMOMETERS.

In order that the MAXIMUM THERMOMETER may register the highest temperature of the day, the column of mercury is disconnected from the mercury in the bulb either by an air-bubble in the column (Phillip's pattern), or by the narrowing of the tube near the bulb (Negretti and Zambra's pattern). In either case the instrument is set by holding it vertically, bulb downwards, and gently shaking and tapping it so as to send the portion of the column that remained at the highest point attained back towards the bulb.

The MINIMUM THERMOMETER registers the lowest temperature by an index enclosed in the column of spirit which is drawn towards the bulb as the temperature falls, but remains stationary during any rise of temperature. The lowest reading is therefore the position of the end of the index furthest from the bulb. The instrument is set by inclining it bulb upwards till the index slips down to the end of the column of spirit. Care must be taken not to force any part of the index beyond the end of the spirit. Should this occur, however, or should portions of the spirit get detached and lodge in the upper part of the tube, it is generally possible to set the instrument right again by grasping it near the end furthest from the bulb and giving several rapid vertical swings at arm's length, so as to drive the spirit and index towards the bulb by centrifugal force.

Both Maximum and Minimum should be read and set at 9 P.M. The readings should be written down before the Thermometers are touched; and after setting, both should agree very nearly with the Dry Bulb temperature at that hour. Any difference from the Dry Bulb of more than a degree may be regarded by the Observer as an indication either that the instrument is not properly set, or that it is out of order.

DRY AND WET BULB THERMOMETERS.

The Hygrometer in use at the Society's Stations consists of two thermometers—a Dry and a Wet Bulb—of similar form, and usually mounted on one frame. The bulbs should project at least an inch from the frame, and the Wet Bulb be covered with muslin and connected by strands of cotton with the water cistern. This cistern should be placed an inch or two below the level of the bulbs and at the side of the Wet Bulb furthest from the Dry Bulb; it should not stand directly under the Wet Bulb. Muslins and strands are supplied to most stations from the Society's office, and should be renewed at least once a month. In putting on a fresh muslin care should be taken to touch it as little as may be with the fingers. In frosty weather the strands do not convey water to the muslin, but an accurate observation can generally be insured by soaking the Wet Bulb in water a quarter of an hour before the observation, as from the film of ice thus formed on the muslin evaporation goes on in the same way as from the wet muslin under ordinary circumstances.

RAIN GAUGE.

The Rain Gauge should be read at 9 A.M. each day, and the amount entered to the *previous day on the Schedule*: thus the quantity measured at 9 A.M. on the 5th should be put down on the line containing the observations of the 4th of the month, since out of the twenty-four hours ending at 9 A.M. on 5th, fifteen belong to the 4th and only nine to the 5th, so that the amount may more properly be credited to the former day. The monthly total for, say, January is thus what falls between 9 A.M. on 1st January and 9 A.M. on 1st February.

The measuring glass is divided to hundredths of an inch—the highest line indicating ·50, that is fifty hundredths or half an inch. The amount should be entered on the Schedule thus: if up to say the sixth line in the glass as ·06, if up to the twenty-third line as ·23, if up to the thirtieth line as ·30, and so on, there being always two figures put down to the right of the decimal point. Care should be taken to avoid entering ·08 as simply 8, or ·30 as ·3, as this may cause confusion when adding the figures to get the total for the month.

When the fall exceeds one fill of the measuring glass it is necessary to measure it in portions, and each successive reading should be jotted down on the flyleaf of the note-book or other convenient place before the glass is emptied. Thus after heavy rain the amounts measured might be:—

·47
·42
·38
1·27

The total, 1·27, would be entered on the Schedule.

The glass must be held vertically or placed on a level surface when reading. A little uncertainty is sometimes caused by the upward curvature of the water where it touches the side of the glass, but the true reading is half way between the two apparent edges of the water surface. When there is nothing in the gauge a stroke (——) should be entered on the Schedule rather than the figure 0.

Snow or **Hail** is counted as Rainfall, and should be melted and measured as such. The upper part of the gauge may be taken indoors, and what is lying in it thawed. To save time, especially if snow or rain be then falling, it is convenient to add a measured quantity of warm water to the snow in the gauge, this quantity being afterwards deducted from the total to get the amount that has fallen. The depth of snow lying on the ground should be noted in the Remarks column.

In gauges, such as Flemings, in which a float and measuring rod is used, the rod should be removed or tied down below the level of the rim, except when a measurement is being taken, because if allowed to project above the gauge, it would prevent it catching the true amount of fall.

If a gauge is only read once a month this should be done on the morning of the 1st, and the amount entered to the previous month.

The Rain Gauge should be placed in an open situation, if possible with no elevated objects close to it, in any case trees, walls, etc., should never be nearer to the gauge in horizontal distance than their own height. The gauge should be firmly fixed with its rim 12 inches above ground; if surrounded by grass, care must be taken that it is never allowed to grow as high as the rim. The gauges at most Stations are five inches in diameter, though a few of larger or smaller size are also in use. A convenient way of fixing a gauge in position is to drive four stout wooden pegs from 12 to 18 inches long into the ground, one at each side of the gauge.

WIND, CLOUD, SUNSHINE, ETC.

WIND.

The direction and force of the Wind should be noted 9 A.M. and 9 P.M. In confined situations where the true direction cannot be easily observed, it is best to ascertain this by watching the movement of smoke from chimneys or even of the lower clouds. The force of the wind should be noted according to the scale given on the other side of the Schedule.

At Stations where an Anemometer is in use, the readings at 9 A.M. each day should be put down in the column provided, the values being entered to the previous day, as in the case of the Rainfall.

CLOUDS.

The amount of Cloud should be estimated on the scale, 0 to 10, 0 indicating a clear and 10 an overcast sky. Only the part of the sky over 30° above the horizon should be taken into account, as it is impossible to estimate the space covered by Clouds nearer the horizon. A convenient table for noting briefly the species of Cloud will be found on the other side of the Schedule. It is desirable to note, if possible, the direction from which the Clouds are moving. If there is more than one layer of clouds on the sky, they should be noted.

Thus, for example, | Cir. W. . . 4 / Cum. Str. S.W. 2 | would indicate that four-tenths of the sky was covered with cirrus moving from the West, and two-tenths with cumulus moving from the S.W.

SUNSHINE.

This column is primarily for those Stations where a Sunshine Recorder is kept; at other Stations, however, the Observer may note in it the number of hours each day that the sun shines with sufficient clearness to cast a distinct shadow.

RADIATION THERMOMETERS.

A MAXIMUM THERMOMETER, with its bulb blackened and enclosed in an outer glass bulb exhausted of air, is used at many stations to register the highest temperature in the sun. It should be mounted horizontally about four feet above ground with its bulb pointing south, and should be read and set at 9 P.M.

A MINIMUM THERMOMETER on grass is used to register the lowest radiation temperature at night. It should be placed on wooden supports a few inches above the surface of the grass. It may be read and set at 9 P.M., but in warm weather, as the spirit in this instrument is liable to evaporate when exposed to bright sunshine and to condense again in the upper part of the tube, it is better to read it at 9 A.M., to put it inside the screen during the day, and to set and replace it at 9 P.M.

THERMOMETERS UNDER GROUND.

These should be read at 9 A.M., and the readings entered on the day on which they are made.

REMARKS.

In the Remarks column should be noted all occurrences of Snow, Hail, or Heavy Rain; of Thunder, or Lightning, or both together; of all Auroras, Meteors, or Halos round the sun or moon; Fogs, Gales or Storms, and generally of all noteworthy Weather phenomena.

The table and additional lines on the back of the Schedule are for the use of those Observers who wish to record Notes connected with the changes of the Seasons, such as the growth of Crops, Fruit, etc., and the migrations of Birds; also the prevalence of Diseases in man, in the lower animals, and in plants. Such observations are often of great interest and utility when taken in conjunction with the ordinary Meteorological records.

DATES IN CONNECTION WITH THE PERIODICAL RETURN OF THE SEASONS.

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

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

The Society will be glad to receive any portions of the information indicated in this table that may come under the Observer's notice.

ADDITIONAL REMARKS.

THE SECRETARY,
Scottish Meteorological Society,
122 *George Street,*
EDINBURGH.

BOOK POST.

SCOTTISH METEOROLOGICAL SOCIETY.

Observations taken at Duthie Park, Aberdeen County of Aberdeen, During the MONTH of April 1909.

Lat. ____, Long. ____, Distance from Sea 2 miles. Height of Cistern of the Barometer above Mean Sea-Level 44 feet, above Ground 4 feet.

Diameter of Rain Gauge 5" inches. Height of Rim of Gauge above Ground 12 inches

The Hours of Observation are of Greenwich Time.

Days of Month.	BAROMETER. 9 A.M. Barometer. No. ____	9 A.M. Attached Thermometer	9 P.M. Barometer. No. ____	9 P.M. Attached Thermometer	SELF-REGISTERING THERMOMETERS, Read Daily, at 9 P.M. Protected in Screen, 4 feet above Ground. Max. No.	Min. No.	Black Bulb Max. in Sun. No. ____	Min. on Grass. No. ____	HYGROMETER. Dry No. ____ Wet No. ____ 9 A.M. Dry bulb.	9 A.M. Wet bulb.	9 P.M. Dry bulb.	9 P.M. Wet bulb.	RAIN. Amount at 9 A.M.	WIND. 9 A.M. Direction.	9 A.M. Force. Scale of 0—12.	9 P.M. Direction.	9 P.M. Force. Scale of 0—12.	Anemometer. 9 A.M.	CLOUDS. 9 A.M. Species and Direction.	9 A.M. Amount (0—10).	9 P.M. Species and Direction.	9 P.M. Amount (0—10).	SUNSHINE. Hours.	THERMOMETERS under Ground. 9 A.M. No. 3 ins.	No. 12 ins.	No. 22 ins.	No. 36 ins.	No. 48 ins.	GENERAL REMARKS. Occurrence of Snow, Hail, Thunder, Lightning, Fog, Gales, Meteors, Auroras. Remarkable Depression or Elevation of Barometer, etc. *Mention the hour at which Storms, including Thunder and Lightning, began and ended.*	Days of Month.
	inches.	°	inches.	°	°	°	°	°	°	°	°	°	inches.											°	°	°	°	°		
1	30·130	45	30·410	47	47·6	36·8			42·2	39·0	42·0	37·5	0·00	NE	4	N	2		Cl	8	Cl	8							Fair & fine all day & frequent Sandflurries	1
2	30·500	48	30·445	43	44·4	35·0			43·0	38·6	42·0	40·0	0·00	N	2	S	2		ci	8	ci	8							fair very fine cold low arcs (night)	2
3	30·350	47	30·250	50	44·5	36·8			44·0	40·0	42·5	41·0	0·25	NE	4	S	8		ci	8	ci	8							fair cold all day some rain pm	3
4	30·225	47	30·350	50	45·4	39·4			42·4	41·0	45·0	43·0	0·00	SW	6	SW	4		ci	8	ci	8							dull heavy fair latter	4
5	30·425	49	30·475	50	50·0	34·5			44·6	40·3	43·5	41·0	0·00	S	6	SW	2		ci	3	ci	3							fair clear & fine	5
6	30·500	47	30·476	51	52·0	33·0			45·2	41·6	40·0	38·0	0·00	SW	2	SW	2		Cl	4	—	—							fair very fine all day	6
7	30·450	47	30·400	51	60·0	30·0			42·8	38·4	50·0	48·0	0·00	SW	2	SW	2		ci	4		0							white frost, fair & fine	7
8	30·350	50	30·300	50	66·0	34·1			50·3	45·0	48·0	45·5	0·00	SW	2	SW	2			0		0							Do Do Do	8
9	30·200	50	30·200	54	59·0	34·0			46·9	42·4	47·0	45·0	0·00	S	2	S	2		ci	4		0							Do Do Do	9
10	30·050	50	29·850	55	64·1	34·0			48·8	44·4	48·0	45·0	0·00	SW	2	SW	2			0	ci	8							Do Do Do	10
11	29·650	54	29·575	54	63·0	39·0			52·6	47·0	49·4	45·0	0·00	SW	2	W	4		ci	4	ci	5							Do Do Do	11
12	29·450	53	29·350	54	54·0	33·8		×	41·0	44·0	42·5	40·0	0·00	S	2	S	2		ci	6	ci	2							Do some rain pm	12
13	29·410	49	29·300	45	52·9	30·5			50·2	44·0	45·0	44·0	0·06	W	2	SE	2		ci	2	N	10							Do Do Do	13
14	29·450	50	29·875	50	47·2	30·6			40·0	39·6	46·0	45·1	0·75	E	4	E	4		N	10	N	10							fair rain all night	14
15	29·850	50	29·880	38	59·0	33·4		×	38·4	33·4	46·0	43·5	0·21	SW	4	SW	1		N	10	N	10							fair dull most of day	15
16	29·975	51	29·700	51	47·0	33·0			45·7	43·6	46·1	44·0	0·02	SW	4	NE	4		N	10	N	10							dull & some rain heavy pm & fine	16
17	29·700	49	29·650	54	53·0	30·0			47·0	44·8	47·0	45·0	0·31	SW	2	S	2		ci	4	ci	5							fair & fine slight rain afternoon	17
18	29·610	52	29·700	54	59·4	39·0			51·0	46·6	45·0	42·0	0·02	SW	2	SW	2			0		0							fair clear all day	18
19	29·950	52	29·925	54	59·5	33·2			46·1	44·0	48·0	43·0	0·12	SW	2	SE	4		ci	2	ci	3							Do Do	19
20	29·650	51	30·000	54	56·2	43·0			46·3	45·0	46·0	43·0	0·04	SW	2	NW	2		ci	10	Ci	3							dull rain fair PM	20
21	30·000	51	29·900	52	47·0	33·1			45·2	44·5	42·0	40·0	0·02	SE	2	SE	4		N	10	N	10							fair dull all day	21
22	29·950	48	29·850	53	50·0	34·0			44·8	43·0	44·8	43·8	0·50	SE	4	SW	2		N	9	N	10							fair dull rain PM	22
23	29·500	43	29·575	54	59·0	42·2	×		52·6	48·6	48·0	45·0	0·00	SW	2	SE	2		ci	5	Ci	4							been heavy rain, fine from 4 PM	23
24	29·500	54	29·450	54	60·5	40·0			52·0	49·0	48·0	45·4	0·00	S	2	NE	2		Ci	4	Ci	8							fair & fine dull PM	24
25	29·450	54	29·500	55	48·5	42·4			49·9	45·5	47·5	45·0	0·12	NW	2	NW	2		Cl	6	N	10							fair heavy rain from 3 PM	25
26	29·675	50	29·700	52	44·0	41·0			44·2	41·6	43·0	42·0	0·04	NE	2	NE	2		N	10	N	10							dull frequent rain all day	26
27	29·619	50	29·662	48	45·0	42·1			43·0	41·0	42·0	40·0	0·24	NW	2	SE	2		N	10	N	10							fair, rain frequent	27
28	29·700	51	29·620	46	48·6	34·6			44·0	42·0	41·0	39·0	0·10	SE	2	W	4		Ci	8	0	0							fair am rain later	28
29	29·638	56	29·800	56	50·0	45·0	×		45·0	32·0	38·0	34·5	0·05	W	2	NW	4		Ci	6	Ci	4							fair clear cold	29
30	29·900	54	29·910	50	45·0	32·6			37·0	34·5	36·0	34·0	0·14	NW	6	NW	4		ci	4	ci	6							* Snow showers frequent all day	30
31																														31
Sums.	159·3 26·207	11	16103 26·508	9 29	155 73·2	116 182·5			129 168·2	138 64·1	143 136·3	113 67·3	5 3.05				84 2.8			83 2.8		77		75							
Means.	·874	50·1	·884	51·0	52·4	36·1			45·5	42·1	445	42·2	✓									5·9		5·8							
Corrections for Instrumental Errors.						+1·0																								
Corrections for Diurnal Range.																														
Corrected Means																														

Sat to Tues 7

NOTATION USED IN GENERAL REMARKS.

a.	*denotes* aurora.		
d.	,, drizzling rain.		
f.	,, fog.		
fr.	,, frost.		
h.-fr.	,, hoar-frost.		
h.	,, haze.		
hl.	,, hail.		
l.	,, lightning.		
lu. co.	,, lunar corona.		
lu. ha.	,, lunar halo.		
m.	,, mist.		
p.	,, passing showers.		
r.	,, rain.		
r.²	,, heavy rain.		
sl.	,, sleet.		
sn.	,, snow.		
so. ha.	,, solar halo.		
q.	,, squall.		
q.²	,, violent squalls.		
t.	,, thunder.		
t. s.	,, thunder-storm.		

CLOUDS.

High Clouds.

Cirrus,	cir.
Cirro-stratus,	cir.-str.
Cirro-cumulus,	cir.-cum.

Middle Clouds.

Strato-cirrus,	str.-cir.
Cumulo-cirrus,	cum.-cir.

Lower Clouds.

Strato-cumulus,	str.-cum.
Cumulus,	cum.
Cumulo-nimbus,	cum.-nim.
Nimbus,	nim.
Stratus,	str.

BEAUFORT SCALE FOR ESTIMATING FORCE OF WIND—(0–12).

Force.		Force.		Force.	
0	Calm.	5	Fresh Breeze.	9	Strong Gale.
1	Light Air.	6	Strong Breeze.	10	Whole Gale.
2	Light Breeze.	7	Moderate Gale.	11	Storm.
3	Gentle Breeze.	8	Fresh Gale.	12	Hurricane.
4	Moderate Breeze.				

BAROMETER. Corrected Mean at 9 A.M., *minus* Correction for Temp. = ·55 = ·816

Corrected Mean at 9 P.M., *minus* Correction for Temp. = ·60 = ·824

Mean at Station, corrected, and at 32°, = 820

Correction for height, feet above Mean Sea-level, = + 50

Mean, reduced to 32°, and Sea-level, = ·870

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

Lowest Do. Do., on the th, =

Difference, or **Monthly Range,** =

S.-R. THERMOMETER, (in shade) **Highest in Month,** corrected for Index Errors, on the 8 th, = 66.

Lowest in Month, corrected for Index errors, on the 7 th, = 30.

Difference, or **Monthly Range,** = 36.

Mean of all the Highest, = 52·4

Mean of all the Lowest, = 37·1

Difference, or **Mean Daily Range,** = 15·3

Mean Temperature of Month, ½ (Mean Max. + Mean Min.), = 44·8

S.-R. THERMOMETER, Min. on Grass, Lowest in Month, =

,, ,, Mean, =

Black Bulb, Max. in Sun, Highest in Month, =

HYGROMETER, Dry Bulb, Mean of A.M. and P.M. Readings, = 45·0

Wet Bulb, Mean of A.M. and P.M. Readings, = 42·2

Computed **Temperature of Dew-Point,** =

Do. **Elastic Force of Vapour,** = ·237

Do. **Relative Humidity** (Saturation = 100), = 79

RAIN fell on 17 **Days; Amount in Inches,** = 3·05

WIND. SUMMARY.

Direction.	N	NE	E	SE	S	SW	W	NW	Calm or Variable.	Mean Force 0—12.
A.M.	2	3	1	3	4	13	1	3		2·8
P.M.	1	3	1	5	5	9	2	4		2·5
Sum.	3	6	2	8	9	22	3	7		2·8

Observations made and Return verified by ____

(*Signed*) ____

N.B.—**Rain** to be measured at 9 A.M. and the amount entered to the previous day.

See instructions on back of Schedule.

INSTRUCTIONS FOR TAKING METEOROLOGICAL OBSERVATIONS.

In order to insure uniformity in the observations made at the Observing Stations of the Scottish Meteorological Society, the Council request the Observers to adopt the methods described below.

HOURS OF OBSERVATION.

The Council recommend that Observations be made precisely at 9 A.M. and 9 P.M. (Greenwich Time). At both hours the Barometer and Dry and Wet Bulb Thermometers should be read, and notes made of the Wind, Cloud, and general weather. The Rain Gauge should be read at 9 A.M. only, and the Maximum and Minimum Self-registering Thermometers at 9 P.M. only.

It is hoped that every effort will be made to insure punctuality. When, however, an observation is taken not at the usual hours, it is requested that this be stated in a note on the Schedule.

All instruments used should be compared with a certified standard; Observers are requested to communicate with the Secretary before purchasing new or repairing old instruments.

BAROMETER.

The Barometer should be hung in a good light and in a room not exposed to sudden changes of temperature. The upper part of the scale must not be higher than the level of the observer's eye, and the instrument must hang vertically. Barometers should not be moved from their places except by persons accustomed to the work, as they are very liable to get air into the mercury column when improperly handled. Mercurial barometers mounted in metal cases are the only sort suitable for the accurate measurement of atmospheric pressure.

FORTIN BAROMETER.—In setting this instrument the level of the mercury in the glass cistern has first to be adjusted by turning the screw below the cistern till the surface of the mercury just touches the ivory point which projects downwards from the cover of the cistern. A modification of the Fortin pattern is used at several of the Society's Stations, in which the adjustment is made by turning the screw until the zero line on an ivory rod which projects through the cover of the cistern is brought to coincide with the lines on the uprights beside it. In either pattern this cistern adjustment must be made before the Vernier at the top of the mercury column is set.

In the BOARD OF TRADE pattern of barometer no adjustment of the cistern is required, and the Observer can at once proceed to set the Vernier, which in all three classes of instrument is done as follows:—

First see that the Vernier is raised above the mercury, then lower it till its front and back edge both just touch, that is, form a tangent to, the highest part of the mercury column. The top of the mercury is usually slightly convex, and care must be taken not to bring the Vernier down to where the front of the mercury touches the glass, which is below the real top of the column.

The attached thermometer should be read and noted before setting the barometer, as its readings may be affected by heat from the Observer's body while handling the instrument.

The errors most frequently made in reading the barometer are mistakes of 1·000 inch, 0·100 inch, and 0·050 inch; that is to say, instead of 29·365 one of the following is sometimes set down—viz. 30·365, 29·265, or 29·315. Experience having shown that even the best Observers occasionally make these mistakes, the reading, after it is writen down, should be compared again with the scale.

STEVENSON SCREEN.

The Maximum, Minimum, Dry Bulb, and Wet Bulb Thermometers should be placed in a louvred Stevenson Screen standing over grass and with its door facing north. The Dry and Wet Bulb Thermometers may be conveniently attached to upright laths near the front of the Screen, and the Maximum and Minimum Thermometers to others farther back. The height of the Screen should be such that the bulbs of the Dry and Wet Thermometers are four feet above the ground. The Screen should be painted white inside and out.

MAXIMUM AND MINIMUM THERMOMETERS.

In order that the MAXIMUM THERMOMETER may register the highest temperature of the day, the column of mercury is disconnected from the mercury in the bulb either by an air-bubble in the column (Phillip's pattern), or by the narrowing of the tube near the bulb (Negretti and Zambra's pattern). In either case the instrument is set by holding it vertically, bulb downwards, and gently shaking and tapping it so as to send the portion of the column that remained at the highest point attained back towards the bulb.

The MINIMUM THERMOMETER registers the lowest temperature by an index enclosed in the column of spirit which is drawn towards the bulb as the temperature falls, but remains stationary during any rise of temperature. The lowest reading is therefore the position of the end of the index furthest from the bulb. The instrument is set by inclining it bulb upwards till the index slips down to the end of the column of spirit. Care must be taken not to force any part of the index beyond the end of the spirit. Should this occur, however, or should portions of the spirit get detached and lodge in the upper part of the tube, it is generally possible to set the instrument right again by grasping it near the end furthest from the bulb and giving several rapid vertical swings at arm's length, so as to drive the spirit and index towards the bulb by centrifugal force.

Both Maximum and Minimum should be read and set at 9 P.M. The readings should be written down before the Thermometers are touched; and after setting, both should agree very nearly with the Dry Bulb temperature at that hour. Any difference from the Dry Bulb of more than a degree may be regarded by the Observer as an indication either that the instrument is not properly set, or that it is out of order.

DRY AND WET BULB THERMOMETERS.

The Hygrometer in use at the Society's Stations consists of two thermometers—a Dry and a Wet Bulb—of similar form, and usually mounted on one frame. The bulbs should project at least an inch from the frame, and the Wet Bulb be covered with muslin and connected by strands of cotton with the water cistern. This cistern should be placed an inch or two below the level of the bulbs and at the side of the Wet Bulb furthest from the Dry Bulb; it should not stand directly under the Wet Bulb. Muslins and strands are supplied to most stations from the Society's office, and should be renewed at least once a month. In putting on a fresh muslin care should be taken to touch it as little as may be with the fingers. In frosty weather the strands do not convey water to the muslin, but an accurate observation can generally be insured by soaking the Wet Bulb in water a quarter of an hour before the observation, as from the film of ice thus formed on the muslin evaporation goes on in the same way as from the wet muslin under ordinary circumstances.

RAIN GAUGE.

The Rain Gauge should be read at 9 A.M. each day, and the amount entered to the *previous day on the Schedule*: thus the quantity measured at 9 A.M. on the 5th should be put down on the line containing the observations of the 4th of the month, since out of the twenty-four hours ending at 9 A.M. on 5th, fifteen belong to the 4th and only nine to the 5th, so that the amount may more properly be credited to the former day. The monthly total for, say, January is thus what falls between 9 A.M. on 1st January and 9 A.M. on 1st February.

The measuring glass is divided to hundredths of an inch—the highest line indicating ·50, that is fifty hundredths or half an inch. The amount should be entered on the Schedule thus: if up to say the sixth line in the glass as ·06, if up to the twenty-third line as ·23, if up to the thirtieth line as ·30, and so on, there being always two figures put down to the right of the decimal point. Care should be taken to avoid entering ·08 as simply 8, or ·30 as ·3, as this may cause confusion when adding the figures to get the total for the month.

When the fall exceeds one fill of the measuring glass it is necessary to measure it in portions, and each successive reading should be jotted down on the flyleaf of the note-book or other convenient place before the glass is emptied. Thus after heavy rain the amounts measured might be:—

·47
·42
·38
———
1·27

The total, 1·27, would be entered on the Schedule.

The glass must be held vertically or placed on a level surface when reading. A little uncertainty is sometimes caused by the upward curvature of the water where it touches the side of the glass, but the true reading is half way between the two apparent edges of the water surface. When there is nothing in the gauge a stroke (——) should be entered on the Schedule rather than the figure 0.

Snow or **Hail** is counted as Rainfall, and should be melted and measured as such. The upper part of the gauge may be taken indoors, and what is lying in it thawed. To save time, especially if snow or rain be then falling, it is convenient to add a measured quantity of warm water to the snow in the gauge, this quantity being afterwards deducted from the total to get the amount that has fallen. The depth of snow lying on the ground should be noted in the Remarks column.

In gauges, such as Flemings, in which a float and measuring rod is used, the rod should be removed or tied down below the level of the rim, except when a measurement is being taken, because if allowed to project above the gauge, it would prevent it catching the true amount of fall.

If a gauge is only read once a month this should be done on the morning of the 1st, and the amount entered to the previous month.

The Rain Gauge should be placed in an open situation, if possible with no elevated objects close to it, in any case trees, walls, etc., should never be nearer to the gauge in horizontal distance than their own height. The gauge should be firmly fixed with its rim 12 inches above ground; if surrounded by grass, care must be taken that it is never allowed to grow as high as the rim. The gauges at most Stations are five inches in diameter, though a few of larger or smaller size are also in use. A convenient way of fixing a gauge in position is to drive four stout wooden pegs from 12 to 18 inches long into the ground, one at each side of the gauge.

WIND, CLOUD, SUNSHINE, ETC.

WIND.

The direction and force of the Wind should be noted at 9 A.M. and 9 P.M. In confined situations where the true direction cannot be easily observed, it is best to ascertain this by watching the movement of smoke from chimneys, or even of the lower clouds. The force of the wind should be noted according to the scale given on the other side of the Schedule.

At Stations where an Anemometer is in use, the readings at 9 A.M. each day should be put down in the column provided, the values being entered to the previous day, as in the case of the Rainfall.

CLOUDS.

The amount of Cloud should be estimated on the scale, 0 to 10, 0 indicating a clear and 10 an overcast sky. Only the part of the sky over 30° above the horizon should be taken into account, as it is impossible to estimate the space covered by Clouds nearer the horizon. A convenient table for noting briefly the species of Cloud will be found on the other side of the Schedule. It is desirable to note, if possible, the direction from which the Clouds are moving. If there is more than one layer of clouds on the sky, they should be noted.

Thus, for example,

Cir. W. .	4
Cum. Str. S.W.	2

would indicate that four-tenths of the sky was covered with cirrus moving from the West, and two-tenths with cumulus moving from the S.W.

SUNSHINE.

This column is primarily for those Stations where a Sunshine Recorder is kept; at other Stations, however, the Observer may note in it the number of hours each day that the sun shines with sufficient clearness to cast a distinct shadow.

RADIATION THERMOMETERS.

A MAXIMUM THERMOMETER, with its bulb blackened and enclosed in an outer glass bulb exhausted of air, is used at many stations to register the highest temperature in the sun. It should be mounted horizontally about four feet above ground with its bulb pointing south, and should be read and set at 9 P.M.

A MINIMUM THERMOMETER on grass is used to register the lowest radiation temperature at night. It should be placed on wooden supports a few inches above the surface of the grass. It may be read and set at 9 P.M., but in warm weather, as the spirit in this instrument is liable to evaporate when exposed to bright sunshine and to condense again in the upper part of the tube, it is better to read it at 9 A.M., to put it inside the screen during the day, and to set and replace it at 9 P.M.

THERMOMETERS UNDER GROUND.

These should be read at 9 A.M., and the readings entered on the day on which they are made.

REMARKS.

In the Remarks column should be noted all occurrences of Snow, Hail, or Heavy Rain; of Thunder, or Lightning, or both together; of all Auroras, Meteors, or Halos round the sun or moon; Fogs, Gales or Storms, and generally of all noteworthy Weather phenomena.

The table and additional lines on the back of the Schedule are for the use of those Observers who wish to record Notes connected with the changes of the Seasons, such as the growth of Crops, Fruit, etc., and the migrations of Birds; also the prevalence of Diseases in man, in the lower animals, and in plants. Such observations are often of great interest and utility when taken in conjunction with the ordinary Meteorological records.

DATES IN CONNECTION WITH THE PERIODICAL RETURN OF THE SEASONS.

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

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

The Society will be glad to receive any portions of the information indicated in this table that may come under the Observer's notice.

ADDITIONAL REMARKS.

BOOK POST.

THE SECRETARY,
Scottish Meteorological Society,
122 *George Street,*
EDINBURGH.

SCOTTISH METEOROLOGICAL SOCIETY.

Observations taken at Duthie Park Aberdeen, County of Aberdeen, During the MONTH of May 1909.

Lat. ____, Long. ____, Distance from Sea 2 miles. Height of Cistern of the Barometer above Mean Sea-Level 44 feet, above Ground 4 feet.

Diameter of Rain Gauge 5 inches. Height of Rim of Gauge above Ground 12 inches on grass

The Hours of Observation are of Greenwich Time.

Days of Month.	BAROMETER. 9 A.M. Barometer. No.	9 A.M. Attached Thermometer	9 P.M. Barometer. No.	9 P.M. Attached Thermometer	SELF-REGISTERING THERMOMETERS, Read Daily, at 9 P.M. Protected in Screen, 4 feet above Ground. Max. No.	Min. No.	Black Bulb Max. in Sun. No.	Min. on Grass. No.	HYGROMETER. Dry No. ____ Wet No. ____ 9 A.M. Dry bulb.	9 A.M. Wet bulb.	9 P.M. Dry bulb.	9 P.M. Wet bulb.	RAIN. Amount at 9 A.M.	WIND. 9 A.M. Direction.	9 A.M. Force. Scale of 0—12.	9 P.M. Direction.	9 P.M. Force. Scale of 0—12.	Anemometer. 9 A.M.	CLOUDS. 9 A.M. Species and Direction.	9 A.M. Amount (0—10).	9 P.M. Species and Direction.	9 P.M. Amount (0—10).	SUNSHINE. Hours.	THERMOMETERS under Ground. 9 A.M. No. 3 ins.	No. 12 ins.	No. 22 ins.	No. 36 ins.	No. 48 ins.	GENERAL REMARKS. Occurrence of Snow, Hail, Thunder, Lightning, Fog, Gales, Meteors, Auroras, Remarkable Depression or Elevation of Barometer, etc. *Mention the hour at which Storms, including Thunder and Lightning, began and ended.*	Days of Month.
	inches.	°	inches.	°	°	°	°	°	°	°	°	°	inches.											°	°	°	°	°		
1	30.000	46	30.200	49	45.0	32.0			38.6	32.4	35.5	34.0	0.04	NW	6	NW	2		Cu	5	Ci	6						*	Sleet showers fair afternoon	1
2	30.300	49.	30.300	42.	47.2	36.0			43.6	39.5	47.0	46.0	0.06	NW	2	S	2		Ci	10	Ci	4							fair; dull fair & Cool all day	2
3	30.205	49.	30.250	51.	48.5	34.0			46.4	44.2	48.0	46.5	0.05	SW	4	SW	4		N	10	—	—							dull, rain from 9 am.	3
4	30.300	48.	30.400	50.	48.0	34.5			46.0	41.0	44.0	41.0	0.00	S	2	SW	4		Ci	6	—	—							fair & fine all day.	4
5	30.450	53.	30.525	53.	56.5	34.0			53.0	48.5	45.0	43.0	0.00	SW	4	S	2		Ci	2	—	—							" "	5
6	30.550	52.	30.460	54	59.0	33.2			50.0	48.0	41.0	39.0	0.00	SE	2	SE	2		fog	10	—	—						*	fog clearing 9 am rain 9 PM	6
7	30.500	51.	30.455	52	58.4	34.0			53.2	48.2	44.0	40.0	0.00	SE	1	S	1		5		0								fair & very fine all day	7
8	30.300	54.	30.225	52.	4.26	33.4			54.4	49.0	40.0	55.0	0.00	SW	2	NE	4		Ci	10	—								do do	8
9	30.200	53.	30.155	54.	52.0	44.0			46.0	44.6	45.0	43.0	0.00	NE	2	N	2		N	10	N	10							dull damp like rain.	9
10	30.100	52.	30.106	56	55.4	42.2			47.2	42.4	39.0	37.0	0.00	N	2	NE	2		Ci	10	—								fair dull clearing 12 noon	10
11	30.100	50.	30.105	56	57.0	36.0			47.0	43.5	42.5	38.0	0.21	SW	1	N	2		Ci	8	Ci	4							rain then cool	11
12	30.000	51.	30.150	46.	65.4	42.2			39.0	37.0	39.0	37.0	0.08	N	4	NW	4		N	10	Ci	8							been rain fair 9 a.m. cool.	12
13	30.290	48.	30.150	48	49.0	34.8			43.0	38.8	36.0	34.6	0.01	NW	4	N	2		Ci	5	Ci	5							very cold showers all day	13
14	30.080	49.	30.050	47.	46.0	32.5			42.0	38.0	37.0	34.0	0.15	N	4	NW	4		Ci	10	Ci	8						*	Stormy winds cool, snow showers.	14
15	30.025	48.	30.055	46.	48.0	32.0			39.0	32.0	39.0	38.0	0.00	NW	6	NW	4		Ci	6	Ci	3						*	frequent snow showers fairing after 12 P.M.	15
16	30.050	49.	30.050	49.	52.5	31.6			44.5	39.0	39.0	37.0	0.00	SE	2	SW	2		Ci	6	8	2							fair mild all day.	16
17	29.976	50.	30.038	51.	54.0	32.0			48.9	44.0	44.5	46.0	0.00	SE	2	S	2		Ci	8	Ci	5							do do	17
18	30.000	50.	30.051	52.	56.0	34.0			44.4	43.6	45.0	44.0	0.12	NW	2	SW	2		Ci	8	Ci	6						†	some showers thunder after noon	18
19	30.150	53.	30.200	53	56.5	39.0			50.0	45.0	50.5	46.0	0.00	SW	2	S	2		Ci	8	Ci	6							fair mild fine all day	19
20	30.250	53.	30.125	54	58.5	43.6			51.0	46.0	56.0	54.0	0.00	SE	4	S	2		Ci	8	Ci	8							do do	20
21	30.100	56.	30.000	54.	64.2	47.0			55.6	54.0	56.5	43.6	0.00	SW	2	S	2		Ci	8	Ci	8							Dull fair mild all day rain 12 P.M.	21
22	30.075	58.	30.000	58.	68.0	45.0			65.0	64.2	62.0	56.5	0.00	S	1	S	4		—		Ci	5							clear, fair & fine all day	22
23	29.945	58.	30.125	59.	69.0	45.0			56.2	51.6	56.0	49.0	0.02	SW	2	W	2		Ci	8	Cu	5							do do	23
24	30.225	60.	30.200	49.	70.0	44.0			62.8	53.6	49.8	47.0	0.00	SW	2	S	2		Ci	5	Ci	5							do do	24
25	29.920	59.	29.650	58.	55.0	46.2			52.0	49.0	48.6	46.0	0.00	SW	24	S	2		Ci	10	Cu	10							do do	25
26	29.300	56.	29.350	59.	56.0	44.0			48.0	47.5	46.5	45.0	0.56	S	4	E	4		Cu	8	Cu	8							been heavy showers fair 9 A.M.	26
27	29.350	56.	29.515	54.	54.0	44.0			49.0	48.0	47.6	45.0	0.06	SE	4	SE	4		N	10	N	10							fair & fine cool	27
28	29.450	54.	29.625	55.	60.4	45.0			58.3	52.0	45.0	52.0	0.00	SW	2	SW	4		Ci	4	Ci	8							do do	28
29	29.555	56	29.800	55	65.6	45.0			55.5	53.0	56.0	54.0	0.22	SW	2	SW	2		Ci	8	Cu	6							been rain, fine & fair all day	29
30	29.950	59.	30.000	55	62.0	42.0			54.0	49.0	56.0	54.0	0.20 .47	SW	4	SW	4		Ci	5	Ci	5							rain all morning.	30
31	29.900	58	29.850	55	59.8	42.0			54.5	53.4	53.6	52.6	0.20	S	2	NW	10		Cu	10	Cu	8							rain most of day —	31
Sums.	1.926	91	2.256	79	23.4	24.2			167	177	175	152	1.78		87		91			226		156								
Means.	30.062	52.9	30.073	52.5	55.2	38.8			49.7	45.9	46.4	44.5	2.25		2.8		2.9			7.3		5.0								
Corrections for Instrumental Errors.						+1.0																								
Corrections for Diurnal Range.																														
Corrected Means																														

NOTATION USED IN GENERAL REMARKS.

a. *denotes* aurora. d. ,, drizzling rain. f. ,, fog. fr. ,, frost. h.-fr. ,, hoar-frost. h. ,, haze. hl. ,, hail. l. ,, lightning. lu. co. ,, lunar corona. lu. ha. ,, lunar halo. m. ,, mist. p. ,, passing showers. r. ,, rain. r.² ,, heavy rain. sl. ,, sleet. sn. ,, snow. so. ha. ,, solar halo. q. ,, squall. q.² ,, violent squalls. t. ,, thunder. t. s. ,, thunder-storm.

CLOUDS.

HIGH CLOUDS. Cirrus, cir. Cirro-stratus, cir.-str. Cirro-cumulus, cir.-cum.

MIDDLE CLOUDS. Strato-cirrus, str.-cir. Cumulo-cirrus, cum.-cir.

LOWER CLOUDS. Strato-cumulus, str.-cum. Cumulus, cum. Cumulo-nimbus, cum.-nim. Nimbus, nim. Stratus, str.

BEAUFORT SCALE FOR ESTIMATING FORCE OF WIND—(0—12).

FORCE.		FORCE.		FORCE.	
0	Calm.	5	Fresh Breeze.	9	Strong Gale.
1	Light Air.	6	Strong Breeze.	10	Whole Gale.
2	Light Breeze.	7	Moderate Gale.	11	Storm.
3	Gentle Breeze.	8	Fresh Gale.	12	Hurricane.
4	Moderate Breeze.				

BAROMETER. Corrected Mean at 9 A.M., *minus* Correction for Temp. = —.65 } = 29.997

Corrected Mean at 9 P.M., *minus* Correction for Temp. = —.65 } = 30.008

Mean at Station, corrected, and at 32°, = 30.003

Correction for height, feet above Mean Sea-level, = + .049

Mean, reduced to 32°, and Sea-level, = 30.052

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

Lowest Do. Do., on the th, =

Difference, or **Monthly Range,** =

S.-R. THERMOMETER, (in shade) **Highest in Month,** corrected for Index Errors, on the 8 th, = 73

Lowest in Month, corrected for Index errors, on the 1 th, 15, 16, 17 = 33

Difference, or **Monthly Range,** = 40

Mean of all the Highest, = 57.2

Mean of all the Lowest, = 39.8

Difference, or **Mean Daily Range,** = 17.4

Mean Temperature of Month, ½ (Mean Max. + Mean Min.), = 48.5

S.-R. THERMOMETER, Min. on Grass, Lowest in Month, =

,, ,, Mean, =

Black Bulb, Max. in Sun, Highest in Month, =

HYGROMETER, Dry Bulb, Mean of A.M. and P.M. Readings, = 48.1

Wet Bulb, Mean of A.M. and P.M. Readings, = 45.2

Computed **Temperature of Dew-Point,** =

Do. **Elastic Force of Vapour,** = .266

Do. **Relative Humidity** (Saturation = 100), = 79

RAIN fell on 14 **Days; Amount in Inches,** = 2.25

WIND. SUMMARY.

Direction.	N	NE	E	SE	S	SW	W	NW	Calm or Variable.	Mean Force 0—12.
A.M.	3	1		6	4	12		5		
P.M.	3	2	1	2	10	7	1	5		
Sum.	6	3	1	8	14	19	1	10	0	2.9

Observations made and Return verified by Peter Harper

(*Signed*) _____

N.B.—**Rain** to be measured at 9 A.M. and the amount entered to the previous day.

See instructions on back of Schedule.

INSTRUCTIONS FOR TAKING METEOROLOGICAL OBSERVATIONS.

In order to insure uniformity in the observations made at the Observing Stations of the Scottish Meteorological Society, the Council request the Observers to adopt the methods described below.

HOURS OF OBSERVATION.

The Council recommend that Observations be made precisely at 9 A.M. and 9 P.M. (Greenwich Time). At both hours the Barometer and Dry and Wet Bulb Thermometers should be read, and notes made of the Wind, Cloud, and general weather. The Rain Gauge should be read at 9 A.M. only, and the Maximum and Minimum Self-registering Thermometers at 9 P.M. only.

It is hoped that every effort will be made to insure punctuality. When, however, an observation is taken not at the usual hours, it is requested that this be stated in a note on the Schedule.

All instruments used should be compared with a certified standard; Observers are requested to communicate with the Secretary before purchasing new or repairing old instruments.

BAROMETER.

The Barometer should be hung in a good light and in a room not exposed to sudden changes of temperature. The upper part of the scale must not be higher than the level of the observer's eye, and the instrument must hang vertically. Barometers should not be moved from their places except by persons accustomed to the work, as they are very liable to get air into the mercury column when improperly handled. Mercurial barometers mounted in metal cases are the only sort suitable for the accurate measurement of atmospheric pressure.

FORTIN BAROMETER.—In setting this instrument the level of the mercury in the glass cistern has first to be adjusted by turning the screw below the cistern till the surface of the mercury just touches the ivory point which projects downwards from the cover of the cistern. A modification of the Fortin pattern is used at several of the Society's Stations, in which the adjustment is made by turning the screw until the zero line on an ivory rod which projects through the cover of the cistern is brought to coincide with the lines on the uprights beside it. In either pattern this cistern adjustment must be made before the Vernier at the top of the mercury column is set.

In the BOARD OF TRADE pattern of barometer no adjustment of the cistern is required, and the Observer can at once proceed to set the Vernier, which in all three classes of instrument is done as follows:—

First see that the Vernier is raised above the mercury, then lower it till its front and back edge both just touch, that is, form a tangent to, the highest part of the mercury column. The top of the mercury is usually slightly convex, and care must be taken not to bring the Vernier down to where the front of the mercury touches the glass, which is below the real top of the column.

The attached thermometer should be read and noted before setting the barometer, as its readings may be affected by heat from the Observer's body while handling the instrument.

The errors most frequently made in reading the barometer are mistakes of 1·000 inch, 0·100 inch, and 0·050 inch; that is to say, instead of 29·365 one of the following is sometimes set down—viz. 30·365, 29·265, or 29·315. Experience having shown that even the best Observers occasionally make these mistakes, the reading, after it is writen down, should be compared again with the scale.

STEVENSON SCREEN.

The Maximum, Minimum, Dry Bulb, and Wet Bulb Thermometers should be placed in a louvred Stevenson Screen standing over grass and with its door facing north. The Dry and Wet Bulb Thermometers may be conveniently attached to upright laths near the front of the Screen, and the Maximum and Minimum Thermometers to others farther back. The height of the Screen should be such that the bulbs of the Dry and Wet Thermometers are four feet above the ground. The Screen should be painted white inside and out.

MAXIMUM AND MINIMUM THERMOMETERS.

In order that the MAXIMUM THERMOMETER may register the highest temperature of the day, the column of mercury is disconnected from the mercury in the bulb either by an air-bubble in the column (Phillip's pattern), or by the narrowing of the tube near the bulb (Negretti and Zambra's pattern). In either case the instrument is set by holding it vertically, bulb downwards, and gently shaking and tapping it so as to send the portion of the column that remained at the highest point attained back towards the bulb.

The MINIMUM THERMOMETER registers the lowest temperature by an index enclosed in the column of spirit which is drawn towards the bulb as the temperature falls, but remains stationary during any rise of temperature. The lowest reading is therefore the position of the end of the index furthest from the bulb. The instrument is set by inclining it bulb upwards till the index slips down to the end of the column of spirit. Care must be taken not to force any part of the index beyond the end of the spirit. Should this occur, however, or should portions of the spirit get detached and lodge in the upper part of the tube, it is generally possible to set the instrument right again by grasping it near the end furthest from the bulb and giving several rapid vertical swings at arm's length, so as to drive the spirit and index towards the bulb by centrifugal force.

Both Maximum and Minimum should be read and set at 9 P.M. The readings should be written down before the Thermometers are touched; and after setting, both should agree very nearly with the Dry Bulb temperature at that hour. Any difference from the Dry Bulb of more than a degree may be regarded by the Observer as an indication either that the instrument is not properly set, or that it is out of order.

DRY AND WET BULB THERMOMETERS.

The Hygrometer in use at the Society's Stations consists of two thermometers—a Dry and a Wet Bulb—of similar form, and usually mounted on one frame. The bulbs should project at least an inch from the frame, and the Wet Bulb be covered with muslin and connected by strands of cotton with the water cistern. This cistern should be placed an inch or two below the level of the bulbs and at the side of the Wet Bulb furthest from the Dry Bulb; it should not stand directly under the Wet Bulb. Muslins and strands are supplied to most stations from the Society's office, and should be renewed at least once a month. In putting on a fresh muslin care should be taken to touch it as little as may be with the fingers. In frosty weather the strands do not convey water to the muslin, but an accurate observation can generally be insured by soaking the Wet Bulb in water a quarter of an hour before the observation, as from the film of ice thus formed on the muslin evaporation goes on in the same way as from the wet muslin under ordinary circumstances.

RAIN GAUGE.

The Rain Gauge should be read at 9 A.M. each day, and the amount entered to the *previous day on the Schedule*: thus the quantity measured at 9 A.M. on the 5th should be put down on the line containing the observations of the 4th of the month, since out of the twenty-four hours ending at 9 A.M. on 5th, fifteen belong to the 4th and only nine to the 5th, so that the amount may more properly be credited to the former day. The monthly total for, say, January is thus what falls between 9 A.M. on 1st January and 9 A.M. on 1st February.

The measuring glass is divided to hundredths of an inch—the highest line indicating ·50, that is fifty hundredths or half an inch. The amount should be entered on the Schedule thus: if up to say the sixth line in the glass as ·06, if up to the twenty-third line as ·23, if up to the thirtieth line as ·30, and so on, there being always two figures put down to the right of the decimal point. Care should be taken to avoid entering ·08 as simply 8, or ·30 as ·3, as this may cause confusion when adding the figures to get the total for the month.

When the fall exceeds one fill of the measuring glass it is necessary to measure it in portions, and each successive reading should be jotted down on the flyleaf of the note-book or other convenient place before the glass is emptied. Thus after heavy rain the amounts measured might be:—

·47
·42
·38
———
1·27

The total, 1·27, would be entered on the Schedule.

The glass must be held vertically or placed on a level surface when reading. A little uncertainty is sometimes caused by the upward curvature of the water where it touches the side of the glass, but the true reading is half way between the two apparent edges of the water surface. When there is nothing in the gauge a stroke (——) should be entered on the Schedule rather than the figure 0.

Snow or **Hail** is counted as Rainfall, and should be melted and measured as such. The upper part of the gauge may be taken indoors, and what is lying in it thawed. To save time, especially if snow or rain be then falling, it is convenient to add a measured quantity of warm water to the snow in the gauge, this quantity being afterwards deducted from the total to get the amount that has fallen. The depth of snow lying on the ground should be noted in the Remarks column.

In gauges, such as Flemings, in which a float and measuring rod is used, the rod should be removed or tied down below the level of the rim, except when a measurement is being taken, because if allowed to project above the gauge, it would prevent it catching the true amount of fall.

If a gauge is only read once a month this should be done on the morning of the 1st, and the amount entered to the previous month.

The Rain Gauge should be placed in an open situation, if possible with no elevated objects close to it, in any case trees, walls, etc., should never be nearer to the gauge in horizontal distance than their own height. The gauge should be firmly fixed with its rim 12 inches above ground; if surrounded by grass, care must be taken that it is never allowed to grow as high as the rim. The gauges at most Stations are five inches in diameter, though a few of larger or smaller size are also in use. A convenient way of fixing a gauge in position is to drive four stout wooden pegs from 12 to 18 inches long into the ground, one at each side of the gauge.

WIND, CLOUD, SUNSHINE, ETC.

WIND.

The direction and force of the Wind should be noted at 9 A.M. and 9 P.M. In confined situations where the true direction cannot be easily observed, it is best to ascertain this by watching the movement of smoke from chimneys, or even of the lower clouds. The force of the wind should be noted according to the scale given on the other side of the Schedule.

At Stations where an Anemometer is in use, the readings at 9 A.M. each day should be put down in the column provided, the values being entered to the previous day, as in the case of the Rainfall.

CLOUDS.

The amount of Cloud should be estimated on the scale, 0 to 10, 0 indicating a clear and 10 an overcast sky. Only the part of the sky over 30° above the horizon should be taken into account, as it is impossible to estimate the space covered by Clouds nearer the horizon. A convenient table for noting briefly the species of Cloud will be found on the other side of the Schedule. It is desirable to note, if possible, the direction from which the Clouds are moving. If there is more than one layer of clouds on the sky, they should be noted.

Thus, for example,

Cir. W. . .	4
Cum. Str. S.W.	2

would indicate that four-tenths of the sky was covered with cirrus moving from the West, and two-tenths with cumulus moving from the S.W.

SUNSHINE.

This column is primarily for those Stations where a Sunshine Recorder is kept; at other Stations, however, the Observer may note in it the number of hours each day that the sun shines with sufficient clearness to cast a distinct shadow.

RADIATION THERMOMETERS.

A MAXIMUM THERMOMETER, with its bulb blackened and enclosed in an outer glass bulb exhausted of air, is used at many stations to register the highest temperature in the sun. It should be mounted horizontally about four feet above ground with its bulb pointing south, and should be read and set at 9 P.M.

A MINIMUM THERMOMETER on grass is used to register the lowest radiation temperature at night. It should be placed on wooden supports a few inches above the surface of the grass. It may be read and set at 9 P.M., but in warm weather, as the spirit in this instrument is liable to evaporate when exposed to bright sunshine and to condense again in the upper part of the tube, it is better to read it at 9 A.M., to put it inside the screen during the day, and to set and replace it at 9 P.M.

THERMOMETERS UNDER GROUND.

These should be read at 9 A.M., and the readings entered on the day on which they are made.

REMARKS.

In the Remarks column should be noted all occurrences of Snow, Hail, or Heavy Rain; of Thunder, or Lightning, or both together; of all Auroras, Meteors, or Halos round the sun or moon; Fogs, Gales or Storms, and generally of all noteworthy Weather phenomena.

The table and additional lines on the back of the Schedule are for the use of those Observers who wish to record Notes connected with the changes of the Seasons, such as the growth of Crops, Fruit, etc., and the migrations of Birds; also the prevalence of Diseases in man, in the lower animals, and in plants. Such observations are often of great interest and utility when taken in conjunction with the ordinary Meteorological records.

DATES IN CONNECTION WITH THE PERIODICAL RETURN OF THE SEASONS.

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

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

The Society will be glad to receive any portions of the information indicated in this table that may come under the Observer's notice.

ADDITIONAL REMARKS.

BOOK POST.

THE SECRETARY,
Scottish Meteorological Society,
122 *George Street,*
EDINBURGH.

SCOTTISH METEOROLOGICAL SOCIETY.

Observations taken at Aberdeen, County of _____, During the MONTH of June 1909.

Lat. _____, Long. _____, Distance from Sea _____ miles. Height of Cistern of the Barometer above Mean Sea-Level _____ feet, above Ground _____ feet.

Diameter of Rain Gauge _____ inches. Height of Rim of Gauge above Ground _____

The Hours of Observation are of Greenwich Time.

Days of Month.	BAROMETER. 9 A.M. Barometer. No.	9 A.M. Attached Thermometer	9 P.M. Barometer. No.	9 P.M. Attached Thermometer	SELF-REGISTERING THERMOMETERS, Read Daily, at 9 P.M. Protected in Screen, 4 feet above Ground. Max. No.	Min. No.	Black Bulb Max. in Sun. No.	Min. on Grass. No.	HYGROMETER. Dry No. ___ Wet No. ___ 9 A.M. Dry bulb.	9 A.M. Wet bulb.	9 P.M. Dry bulb.	9 P.M. Wet bulb.	RAIN. Amount at 9 A.M.	WIND. 9 A.M. Direction.	9 A.M. Force. Scale of 0—12.	9 P.M. Direction.	9 P.M. Force. Scale of 0—12.	Anemometer. 9 A.M.	CLOUDS. 9 A.M. Species and Direction.	9 A.M. Amount (0—10).	9 P.M. Species and Direction.	9 P.M. Amount (0—10).	SUNSHINE. Hours.	THERMOMETERS under Ground. 9 A.M. No. 3 ins.	No. 12 ins.	No. 22 ins.	No. 36 ins.	No. 48 ins.	GENERAL REMARKS. Occurrence of Snow, Hail, Thunder, Lightning, Fog, Gales, Meteors, Auroras, Remarkable Depression or Elevation of Barometer, etc. *Mention the hour at which Storms, including Thunder and Lightning, began and ended.*	Days of Month.
	inches.	°	inches.	°	°	°	°	°	°	°	°	°	inches.												°	°	°	°	°		
1																															1
2																															2
3																															3
4																															4
5																															5
6																															6
7																															7
8																															8
9																															9
10																															10
11																															11
12																															12
13																															13
14																															14
15																															15
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26																															26
27																															27
28																															28
29																															29
30																															30
31																															31
Sums.																															
Means.																															
Corrections for Instrumental Errors.																															
Corrections for Diurnal Range.																															
Corrected Means																															

NOTATION USED IN GENERAL REMARKS.

a.	*denotes* aurora.	
d.	,,	drizzling rain.
f.	,,	fog.
fr.	,,	frost.
h.-fr.	,,	hoar-frost.
h.	,,	haze.
hl.	,,	hail.
l.	,,	lightning.
lu. co.	,,	lunar corona.
lu. ha.	,,	lunar halo.
m.	,,	mist.
p.	,,	passing showers.
r.	,,	rain.
r.²	,,	heavy rain.
sl.	,,	sleet.
sn.	,,	snow.
so. ha.	,,	solar halo.
q.	,,	squall.
q.²	,,	violent squalls.
t.	,,	thunder.
t. s.	,,	thunder-storm.

CLOUDS.

HIGH CLOUDS.

Cirrus, ...	cir.
Cirro-stratus, . .	cir.-str.
Cirro-cumulus, . .	cir.-cum.

MIDDLE CLOUDS.

Strato-cirrus, . .	str.-cir.
Cumulo-cirrus, . .	cum.-cir.

LOWER CLOUDS.

Strato-cumulus, . .	str.-cum.
Cumulus, ...	cum.
Cumulo-nimbus, . .	cum.-nim.
Nimbus, ...	nim.
Stratus, ...	str.

BEAUFORT SCALE FOR ESTIMATING FORCE OF WIND—(0—12).

FORCE.		FORCE.		FORCE.	
0	Calm.	5	Fresh Breeze.	9	Strong Gale.
1	Light Air.	6	Strong Breeze.	10	Whole Gale.
2	Light Breeze.	7	Moderate Gale.	11	Storm.
3	Gentle Breeze.	8	Fresh Gale.	12	Hurricane.
4	Moderate Breeze.				

BAROMETER. Corrected Mean at 9 A.M., *minus* Correction for Temp. = ... — ..... } = _____

Corrected Mean at 9 P.M., *minus* Correction for Temp. = ... — ..... } = _____

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

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

Mean, reduced to 32°, and Sea-level, ... = _____

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

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

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

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

Lowest in Month, corrected for Index errors, on the _____ th, ... = _____

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

Mean of all the Highest, ... = _____

Mean of all the Lowest, ... = _____

Difference, or **Mean Daily Range,** ..... = _____

Mean Temperature of Month, ½ (Mean Max. + Mean Min.), ... = _____

S.-R. THERMOMETER, Min. on Grass, Lowest in Month, ... = _____

,, ,, Mean, ... = _____

Black Bulb, Max. in Sun, Highest in Month, ... = _____

HYGROMETER, Dry Bulb, Mean of A.M. and P.M. Readings, ... = _____

Wet Bulb, Mean of A.M. and P.M. Readings, ... = _____

Computed **Temperature of Dew-Point,** ..... = _____

Do. **Elastic Force of Vapour,** ..... = _____

Do. **Relative Humidity** (Saturation = 100), = _____

RAIN fell on _____ **Days; Amount in Inches,** ..... = _____

WIND. SUMMARY. Direction.	N	NE	E	SE	S	SW	W	NW	Calm or Variable.	Mean Force 0—12.
A.M.										
P.M.										
Sum.										

Observations made and Return verified by _____

(*Signed*) _____

N.B.—**Rain** to be measured at 9 A.M. and the amount entered to the previous day.

See instructions on back of Schedule.

INSTRUCTIONS FOR TAKING METEOROLOGICAL OBSERVATIONS.

THE SECRETARY,
Scottish Meteorological Society,
122 *George Street,*
EDINBURGH.

BOOK POST.

Halfpenny Stamp.

In order to insure uniformity in the observations made at the Observing Stations of the Scottish Meteorological Society, the Council request the Observers to adopt the methods described below.

HOURS OF OBSERVATION.

The Council recommend that Observations be made precisely at 9 A.M. and 9 P.M. (Greenwich Time). At both hours the Barometer and Dry and Wet Bulb Thermometers should be read, and notes made of the Wind, Cloud, and general weather. The Rain Gauge should be read at 9 A.M. only, and the Maximum and Minimum Self-registering Thermometers at 9 P.M. only.

It is hoped that every effort will be made to insure punctuality. When, however, an observation is taken not at the usual hours, it is requested that this be stated in a note on the Schedule.

All instruments used should be compared with a certified standard; Observers are requested to communicate with the Secretary before purchasing new or repairing old instruments.

BAROMETER.

The Barometer should be hung in a good light and in a room not exposed to sudden changes of temperature. The upper part of the scale must not be higher than the level of the observer's eye, and the instrument must hang vertically. Barometers should not be moved from their places except by persons accustomed to the work, as they are very liable to get air into the mercury column when improperly handled. Mercurial barometers mounted in metal cases are the only sort suitable for the accurate measurement of atmospheric pressure.

FORTIN BAROMETER.—In setting this instrument the level of the mercury in the glass cistern has first to be adjusted by turning the screw below the cistern till the surface of the mercury just touches the ivory point which projects downwards from the cover of the cistern. A modification of the Fortin pattern is used at several of the Society's Stations, in which the adjustment is made by turning the screw until the zero line on an ivory rod which projects through the cover of the cistern is brought to coincide with the lines on the uprights beside it. In either pattern this cistern adjustment must be made before the Vernier at the top of the mercury column is set.

In the BOARD OF TRADE pattern of barometer no adjustment of the cistern is required, and the Observer can at once proceed to set the Vernier, which in all three classes of instrument is done as follows:—

First see that the Vernier is raised above the mercury, then lower it till its front and back edge both just touch, that is, form a tangent to, the highest part of the mercury column. The top of the mercury is usually slightly convex, and care must be taken not to bring the Vernier down to where the front of the mercury touches the glass, which is below the real top of the column.

The attached thermometer should be read and noted before setting the barometer, as its readings may be affected by heat from the Observer's body while handling the instrument.

The errors most frequently made in reading the barometer are mistakes of 1·000 inch, 0·100 inch, and 0·050 inch; that is to say, instead of 29·365 one of the following is sometimes set down—viz. 30·365, 29·265, or 29·315. Experience having shown that even the best Observers occasionally make these mistakes, the reading, after it is writen down, should be compared again with the scale.

STEVENSON SCREEN.

The Maximum, Minimum, Dry Bulb, and Wet Bulb Thermometers should be placed in a louvred Stevenson Screen standing over grass and with its door facing north. The Dry and Wet Bulb Thermometers may be conveniently attached to upright laths near the front of the Screen, and the Maximum and Minimum Thermometers to others farther back. The height of the Screen should be such that the bulbs of the Dry and Wet Thermometers are four feet above the ground. The Screen should be painted white inside and out.

MAXIMUM AND MINIMUM THERMOMETERS.

In order that the MAXIMUM THERMOMETER may register the highest temperature of the day, the column of mercury is disconnected from the mercury in the bulb either by an air-bubble in the column (Phillip's pattern), or by the narrowing of the tube near the bulb (Negretti and Zambra's pattern). In either case the instrument is set by holding it vertically, bulb downwards, and gently shaking and tapping it so as to send the portion of the column that remained at the highest point attained back towards the bulb.

The MINIMUM THERMOMETER registers the lowest temperature by an index enclosed in the column of spirit which is drawn towards the bulb as the temperature falls, but remains stationary during any rise of temperature. The lowest reading is therefore the position of the end of the index furthest from the bulb. The instrument is set by inclining it bulb upwards till the index slips down to the end of the column of spirit. Care must be taken not to force any part of the index beyond the end of the spirit. Should this occur, however, or should portions of the spirit get detached and lodge in the upper part of the tube, it is generally possible to set the instrument right again by grasping it near the end furthest from the bulb and giving several rapid vertical swings at arm's length, so as to drive the spirit and index towards the bulb by centrifugal force.

Both Maximum and Minimum should be read and set at 9 P.M. The readings should be written down before the Thermometers are touched; and after setting, both should agree very nearly with the Dry Bulb temperature at that hour. Any difference from the Dry Bulb of more than a degree may be regarded by the Observer as an indication either that the instrument is not properly set, or that it is out of order.

DRY AND WET BULB THERMOMETERS.

The Hygrometer in use at the Society's Stations consists of two thermometers—a Dry and a Wet Bulb—of similar form, and usually mounted on one frame. The bulbs should project at least an inch from the frame, and the Wet Bulb be covered with muslin and connected by strands of cotton with the water cistern. This cistern should be placed an inch or two below the level of the bulbs and at the side of the Wet Bulb furthest from the Dry Bulb; it should not stand directly under the Wet Bulb. Muslins and strands are supplied to most stations from the Society's office, and should be renewed at least once a month. In putting on a fresh muslin care should be taken to touch it as little as may be with the fingers. In frosty weather the strands do not convey water to the muslin, but an accurate observation can generally be insured by soaking the Wet Bulb in water a quarter of an hour before the observation, as from the film of ice thus formed on the muslin evaporation goes on in the same way as from the wet muslin under ordinary circumstances.

RAIN GAUGE.

The Rain Gauge should be read at 9 A.M. each day, and the amount entered to the *previous day on the Schedule*: thus the quantity measured at 9 A.M. on the 5th should be put down on the line containing the observations of the 4th of the month, since out of the twenty-four hours ending at 9 A.M. on 5th, fifteen belong to the 4th and only nine to the 5th, so that the amount may more properly be credited to the former day. The monthly total for, say, January is thus what falls between 9 A.M. on 1st January and 9 A.M. on 1st February.

The measuring glass is divided to hundredths of an inch—the highest line indicating ·50, that is fifty hundredths or half an inch. The amount should be entered on the Schedule thus: if up to say the sixth line in the glass as ·06, if up to the twenty-third line as ·23, if up to the thirtieth line as ·30, and so on, there being always two figures put down to the right of the decimal point. Care should be taken to avoid entering ·08 as simply 8, or ·30 as ·3, as this may cause confusion when adding the figures to get the total for the month.

When the fall exceeds one fill of the measuring glass it is necessary to measure it in portions, and each successive reading should be jotted down on the flyleaf of the note-book or other convenient place before the glass is emptied. Thus after heavy rain the amounts measured might be:—

·47
·42
·38
1·27

The total, 1·27, would be entered on the Schedule.

The glass must be held vertically or placed on a level surface when reading. A little uncertainty is sometimes caused by the upward curvature of the water where it touches the side of the glass, but the true reading is half way between the two apparent edges of the water surface. When there is nothing in the gauge a stroke (——) should be entered on the Schedule rather than the figure 0.

Snow or **Hail** is counted as Rainfall, and should be melted and measured as such. The upper part of the gauge may be taken indoors, and what is lying in it thawed. To save time, especially if snow or rain be then falling, it is convenient to add a measured quantity of warm water to the snow in the gauge, this quantity being afterwards deducted from the total to get the amount that has fallen. The depth of snow lying on the ground should be noted in the Remarks column.

In gauges, such as Flemings, in which a float and measuring rod is used, the rod should be removed or tied down below the level of the rim, except when a measurement is being taken, because if allowed to project above the gauge, it would prevent it catching the true amount of fall.

If a gauge is only read once a month this should be done on the morning of the 1st, and the amount entered to the previous month.

The Rain Gauge should be placed in an open situation, if possible with no elevated objects close to it, in any case trees, walls, etc., should never be nearer to the gauge in horizontal distance than their own height. The gauge should be firmly fixed with its rim 12 inches above ground; if surrounded by grass, care must be taken that it is never allowed to grow as high as the rim. The gauges at most Stations are five inches in diameter, though a few of larger or smaller size are also in use. A convenient way of fixing a gauge in position is to drive four stout wooden pegs from 12 to 18 inches long into the ground, one at each side of the gauge.

WIND, CLOUD, SUNSHINE, ETC.

WIND.

The direction and force of the Wind should be noted at 9 A.M. and 9 P.M. In confined situations where the true direction cannot be easily observed, it is best to ascertain this by watching the movement of smoke from chimneys, or even of the lower clouds. The force of the wind should be noted according to the scale given on the other side of the Schedule.

At Stations where an Anemometer is in use, the readings at 9 A.M. each day should be put down in the column provided, the values being entered to the previous day, as in the case of the Rainfall.

CLOUDS.

The amount of Cloud should be estimated on the scale, 0 to 10, 0 indicating a clear and 10 an overcast sky. Only the part of the sky over 30° above the horizon should be taken into account, as it is impossible to estimate the space covered by Clouds nearer the horizon. A convenient table for noting briefly the species of Cloud will be found on the other side of the Schedule. It is desirable to note, if possible, the direction from which the Clouds are moving. If there is more than one layer of clouds on the sky, they should be noted.

Thus, for example,

Cir. W.	4
Cum. Str. S.W.	2

would indicate that four-tenths of the sky was covered with cirrus moving from the West, and two-tenths with cumulus moving from the S.W.

SUNSHINE.

This column is primarily for those Stations where a Sunshine Recorder is kept; at other Stations, however, the Observer may note in it the number of hours each day that the sun shines with sufficient clearness to cast a distinct shadow.

RADIATION THERMOMETERS.

A MAXIMUM THERMOMETER, with its bulb blackened and enclosed in an outer glass bulb exhausted of air, is used at many stations to register the highest temperature in the sun. It should be mounted horizontally about four feet above ground with its bulb pointing south, and should be read and set at 9 P.M.

A MINIMUM THERMOMETER on grass is used to register the lowest radiation temperature at night. It should be placed on wooden supports a few inches above the surface of the grass. It may be read and set at 9 P.M., but in warm weather, as the spirit in this instrument is liable to evaporate when exposed to bright sunshine and to condense again in the upper part of the tube, it is better to read it at 9 A.M., to put it inside the screen during the day, and to set and replace it at 9 P.M.

THERMOMETERS UNDER GROUND.

These should be read at 9 A.M., and the readings entered on the day on which they are made.

REMARKS.

In the Remarks column should be noted all occurrences of Snow, Hail, or Heavy Rain; of Thunder, or Lightning, or both together; of all Auroras, Meteors, or Halos round the sun or moon; Fogs, Gales or Storms, and generally of all noteworthy Weather phenomena.

The table and additional lines on the back of the Schedule are for the use of those Observers who wish to record Notes connected with the changes of the Seasons, such as the growth of Crops, Fruit, etc., and the migrations of Birds; also the prevalence of Diseases in man, in the lower animals, and in plants. Such observations are often of great interest and utility when taken in conjunction with the ordinary Meteorological records.

DATES IN CONNECTION WITH THE PERIODICAL RETURN OF THE SEASONS.

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

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

The Society will be glad to receive any portions of the information indicated in this table that may come under the Observer's notice.

ADDITIONAL REMARKS.

SCOTTISH METEOROLOGICAL SOCIETY.

Observations taken at Duthie Park Aberdeen, County of Aberdeen, During the MONTH of July 1909.

Lat. ____, Long. ____, Distance from Sea 2 miles. Height of Cistern of the Barometer above Mean Sea-Level 44 feet, above Ground 4 feet.

Diameter of Rain Gauge 5 inches. Height of Rim of Gauge above Ground 12 inches

The Hours of Observation are of Greenwich Time.

Days of Month.	BAROMETER. 9 A.M. Barometer. No.	9 A.M. Attached Thermometer	9 P.M. Barometer. No.	9 P.M. Attached Thermometer	SELF-REGISTERING THERMOMETERS, Read Daily, at 9 P.M. Protected in Screen, 4 feet above Ground. Max.	Min.	Black Bulb Max. in Sun.	Min. on Grass.	HYGROMETER. Dry No. ___ Wet No. ___ 9 A.M. Dry bulb.	9 A.M. Wet bulb.	9 P.M. Dry bulb.	9 P.M. Wet bulb.	RAIN. Amount at 9 A.M.	WIND. 9 A.M. Direction.	9 A.M. Force. Scale of 0—12.	9 P.M. Direction.	9 P.M. Force. Scale of 0—12.	Anemometer. 9 A.M.	CLOUDS. 9 A.M. Species and Direction.	9 A.M. Amount (0—10).	9 P.M. Species and Direction.	9 P.M. Amount (0—10).	SUNSHINE. Hours.	THERMOMETERS under Ground. 9 A.M. No. 3 ins.	No. 12 ins.	No. 22 ins.	No. 36 ins.	No. 48 ins.	GENERAL REMARKS. Occurrence of Snow, Hail, Thunder, Lightning, Fog, Gales, Meteors, Auroras, Remarkable Depression or Elevation of Barometer, etc. *Mention the hour at which Storms, including Thunder and Lightning, began and ended.*	Days of Month.
	inches.	°	inches.	°	°	°	°	°	°	°	°	°	inches.												°	°	°	°	°		
1	30.275	57	30.160		62.0	48.0			52.2	50.5			0.00	SW	4		Ci.	0												Fair Cool	1
2	30.175	58	29.810		65.2	45.0			56.8	47.0			0.01		6		Ci.													Fair mild	2
3	29.845	58			72.0	55.4			60.5	53.6			0.22		5		Ci.													Mild & fine	3
4	29.735	58			61.6	52.0			59.0	54.1			0.24		8		Ci.													Fair & fine	4
5	29.925	59			59.6	51.8			52.4	51.1			0.14		8		Ci													Showers	5
6	29.875	58			61.8	50.0			56.0	54.0			0.15		8		Ci													Dull heavy Clouds	6
7	29.700	60			61.4	50.0			54.6	51.4			0.00		9		Ci													Dull heavy clouds fair cool & mild	7
8	29.900	59			71.0	48.6			54.0	50.1			0.00		8		Ci.													Clear Morning some rain noon	8
9	29.750	63			65.0	48.4			53.3	50.1			0.60		8		Ci													high Storm wind fair	9
10	29.600	60			58.4	48.2			56.0	51.0			0.00		5		Ci.													Do Do Do	10
11	30.000	60			62.0	47.0			57.0	54.0			0.44		6		Ci.													fair Mild heavy rain afternoon	11
12	30.050	59			70.0	49.4			62.0	55.1			0.00		6		Ci.													fair Mild	12
13	29.900	63			69.0	54.2			54.8	52.4			0.00		8		Ci													Do Do Do	13
14	29.950	60			64.0	54.2			59.5	54.0			0.22		6		Ci													fair & very fine rain Afternoon	14
15	30.000	62			70.0	52.3			64.0	60.0			0.00		8		Ci.													some rain. fine afternoon	15
16	29.575	64			58.0	49.8			54.0	53.0			0.12		8		Ci													fine all Day	16
17	29.800	63			68.0	52.2			57.0	52.0			0.00		8		Ci													high gusty Wind fair	17
18	29.925	63			69.0	49.5			61.0	52.0			0.00		8															like rain dull rain latter	18
19	30.055	63			64.0	46.0			56.0	52.5			0.22		3															rain through night fair all day	19
20	30.050	60			59.2	55.0			61.6	57.0			0.00		10		Cl													fair & fine all Day	20
21	29.538	63			61.8	45.0			62.0	58.0			0.02		6															Dull all day cold P. M.	21
22	29.425	60			68.5	48.0			61.0	54.0			0.00		10															fair mild & very fine	22
23	29.250	60			64.5	52.2			57.	50.5			0.00		5		Ci													dull all day rain from 4 P. M.	23
24	29.200	60			58.4	51.0			56.8	55.8			1.75		10															dull been rain all night	24
25	29.300	59			58.4	51.0			54.0	51.0			0.04		10		Cl													fair & fine all day	25
26	29.435	58			59.0	51.0			53.0	50.6			0.03		10															Do Do Do	26
27	29.755	56			63.0	43.8			58	53.2			5.20		4		Ci													dull been rain fair	27
28	29.855	62			62.5	49.7			58	53.8			0.09		8															fair & fine all day	28
29	29.655	61			62.1	51			56.8	54.7			0.06		10															fair & fine	29
30	.645	61			62.9	51			59	55.5			0.20		10																30
31	29.735	60			62.6	53			55.5	53.3																					31
Sums.	16108	11			147	137			116	106			5																		
	23780	07			33.5	30.2			35.8	12.7			2.65																		
Means.	29.767	60.2			64.3	50.0			57.6	53.9	55.6		✓																		
Corrections for Instrumental Errors.					✓	+10 ✓			3.7		3.0																				
Corrections for Diurnal Range.																															
Corrected Means																															

NOTATION USED IN GENERAL REMARKS.

a.	*denotes* aurora.	
d.	,,	drizzling rain.
f.	,,	fog.
fr.	,,	frost.
h.-fr.	,,	hoar-frost.
h.	,,	haze.
hl.	,,	hail.
l.	,,	lightning.
lu. co.	,,	lunar corona.
lu. ha.	,,	lunar halo.
m.	,,	mist.
p.	,,	passing showers.
r.	,,	rain.
r.²	,,	heavy rain.
sl.	,,	sleet.
sn.	,,	snow.
so. ha.	,,	solar halo.
q.	,,	squall.
q.²	,,	violent squalls.
t.	,,	thunder.
t. s.	,,	thunder-storm.

CLOUDS.

High Clouds.

Cirrus,	cir.
Cirro-stratus,	cir.-str.
Cirro-cumulus,	cir.-cum.

Middle Clouds.

Strato-cirrus,	str.-cir.
Cumulo-cirrus,	cum.-cir.

Lower Clouds.

Strato-cumulus,	str.-cum.
Cumulus,	cum.
Cumulo-nimbus,	cum.-nim.
Nimbus,	nim.
Stratus,	str.

BEAUFORT SCALE FOR ESTIMATING FORCE OF WIND—(0—12).

FORCE.		FORCE.		FORCE.	
0	Calm.	5	Fresh Breeze.	9	Strong Gale.
1	Light Air.	6	Strong Breeze.	10	Whole Gale.
2	Light Breeze.	7	Moderate Gale.	11	Storm.
3	Gentle Breeze.	8	Fresh Gale.	12	Hurricane.
4	Moderate Breeze.				

BAROMETER. Corrected Mean at 9 A.M., *minus* Correction for Temp. = ... = 683

Corrected Mean at 9 P.M., *minus* Correction for Temp. = ... = ____

Mean at Station, corrected, and at 32°, ... = 29 683

Correction for height, feet above Mean Sea-level, ... = + 48

Mean, reduced to 32°, and Sea-level, ... = 29 731

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

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

Difference, or **Monthly Range,** ..... = ____

S.-R. THERMOMETER, (in shade) **Highest in Month,** corrected for Index Errors, on the 3 th, ... = 75

Lowest in Month, corrected for Index errors, on the 19 th, ... = 42

Difference, or **Monthly Range,** ..... = 33

Mean of all the Highest, ... = 64.3

Mean of all the Lowest, ... = 51.0

Difference, or **Mean Daily Range,** ..... = 13.3

Mean Temperature of Month, ½ (Mean Max. + Mean Min.), ... = 57.7

S.-R. THERMOMETER, Min. on Grass, Lowest in Month, ... = ____

,, ,, Mean, ... = ____

Black Bulb, Max. in Sun, Highest in Month, ... = ____

HYGROMETER, Dry Bulb, Mean of A.M. and P.M. Readings, ... = 56.6

Wet Bulb, Mean of A.M. and P.M. Readings, ... = 53.2

Computed **Temperature of Dew-Point,** ..... = ____

Do. **Elastic Force of Vapour,** ..... = .362

Do. **Relative Humidity** (Saturation = 100), = 78

RAIN fell on 18 **Days; Amount in Inches,** ..... = 4.65

WIND. SUMMARY. Direction.	N	NE	E	SE	S	SW	W	NW	Calm or Variable.	Mean Force 0—12.
A.M.										
P.M.										
Sum.										

Observations made and Return verified by Peter Harper

(*Signed*) ____

N.B.—**Rain** to be measured at 9 A.M. and the amount entered to the previous day.

See instructions on back of Schedule.

INSTRUCTIONS FOR TAKING METEOROLOGICAL OBSERVATIONS.

In order to insure uniformity in the observations made at the Observing Stations of the Scottish Meteorological Society, the Council request the Observers to adopt the methods described below.

HOURS OF OBSERVATION.

The Council recommend that Observations be made precisely at 9 A.M. and 9 P.M. (Greenwich Time). At both hours the Barometer and Dry and Wet Bulb Thermometers should be read, and notes made of the Wind, Cloud, and general weather. The Rain Gauge should be read at 9 A.M. only, and the Maximum and Minimum Self-registering Thermometers at 9 P.M. only.

It is hoped that every effort will be made to insure punctuality. When, however, an observation is taken not at the usual hours, it is requested that this be stated in a note on the Schedule.

All instruments used should be compared with a certified standard; Observers are requested to communicate with the Secretary before purchasing new or repairing old instruments.

BAROMETER.

The Barometer should be hung in a good light and in a room not exposed to sudden changes of temperature. The upper part of the scale must not be higher than the level of the observer's eye, and the instrument must hang vertically. Barometers should not be moved from their places except by persons accustomed to the work, as they are very liable to get air into the mercury column when improperly handled. Mercurial barometers mounted in metal cases are the only sort suitable for the accurate measurement of atmospheric pressure.

FORTIN BAROMETER.—In setting this instrument the level of the mercury in the glass cistern has first to be adjusted by turning the screw below the cistern till the surface of the mercury just touches the ivory point which projects downwards from the cover of the cistern. A modification of the Fortin pattern is used at several of the Society's Stations, in which the adjustment is made by turning the screw until the zero line on an ivory rod which projects through the cover of the cistern is brought to coincide with the lines on the uprights beside it. In either pattern this cistern adjustment must be made before the Vernier at the top of the mercury column is set.

In the BOARD OF TRADE pattern of barometer no adjustment of the cistern is required, and the Observer can at once proceed to set the Vernier, which in all three classes of instrument is done as follows:—

First see that the Vernier is raised above the mercury, then lower it till its front and back edge both just touch, that is, form a tangent to, the highest part of the mercury column. The top of the mercury is usually slightly convex, and care must be taken not to bring the Vernier down to where the front of the mercury touches the glass, which is below the real top of the column.

The attached thermometer should be read and noted before setting the barometer, as its readings may be affected by heat from the Observer's body while handling the instrument.

The errors most frequently made in reading the barometer are mistakes of 1·000 inch, 0·100 inch, and 0·050 inch; that is to say, instead of 29·365 one of the following is sometimes set down—viz. 30·365, 29·265, or 29·315. Experience having shown that even the best Observers occasionally make these mistakes, the reading, after it is writen down, should be compared again with the scale.

STEVENSON SCREEN.

The Maximum, Minimum, Dry Bulb, and Wet Bulb Thermometers should be placed in a louvred Stevenson Screen standing over grass and with its door facing north. The Dry and Wet Bulb Thermometers may be conveniently attached to upright laths near the front of the Screen, and the Maximum and Minimum Thermometers to others farther back. The height of the Screen should be such that the bulbs of the Dry and Wet Thermometers are four feet above the ground. The Screen should be painted white inside and out.

MAXIMUM AND MINIMUM THERMOMETERS.

In order that the MAXIMUM THERMOMETER may register the highest temperature of the day, the column of mercury is disconnected from the mercury in the bulb either by an air-bubble in the column (Phillip's pattern), or by the narrowing of the tube near the bulb (Negretti and Zambra's pattern). In either case the instrument is set by holding it vertically, bulb downwards, and gently shaking and tapping it so as to send the portion of the column that remained at the highest point attained back towards the bulb.

The MINIMUM THERMOMETER registers the lowest temperature by an index enclosed in the column of spirit which is drawn towards the bulb as the temperature falls, but remains stationary during any rise of temperature. The lowest reading is therefore the position of the end of the index furthest from the bulb. The instrument is set by inclining it bulb upwards till the index slips down to the end of the column of spirit. Care must be taken not to force any part of the index beyond the end of the spirit. Should this occur, however, or should portions of the spirit get detached and lodge in the upper part of the tube, it is generally possible to set the instrument right again by grasping it near the end furthest from the bulb and giving several rapid vertical swings at arm's length, so as to drive the spirit and index towards the bulb by centrifugal force.

Both Maximum and Minimum should be read and set at 9 P.M. The readings should be written down before the Thermometers are touched; and after setting, both should agree very nearly with the Dry Bulb temperature at that hour. Any difference from the Dry Bulb of more than a degree may be regarded by the Observer as an indication either that the instrument is not properly set, or that it is out of order.

DRY AND WET BULB THERMOMETERS.

The Hygrometer in use at the Society's Stations consists of two thermometers—a Dry and a Wet Bulb—of similar form, and usually mounted on one frame. The bulbs should project at least an inch from the frame, and the Wet Bulb be covered with muslin and connected by strands of cotton with the water cistern. This cistern should be placed an inch or two below the level of the bulbs and at the side of the Wet Bulb furthest from the Dry Bulb; it should not stand directly under the Wet Bulb. Muslins and strands are supplied to most stations from the Society's office, and should be renewed at least once a month. In putting on a fresh muslin care should be taken to touch it as little as may be with the fingers. In frosty weather the strands do not convey water to the muslin, but an accurate observation can generally be insured by soaking the Wet Bulb in water a quarter of an hour before the observation, as from the film of ice thus formed on the muslin evaporation goes on in the same way as from the wet muslin under ordinary circumstances.

RAIN GAUGE.

The Rain Gauge should be read at 9 A.M. each day, and the amount entered to the *previous day on the Schedule*: thus the quantity measured at 9 A.M. on the 5th should be put down on the line containing the observations of the 4th of the month, since out of the twenty-four hours ending at 9 A.M. on 5th, fifteen belong to the 4th and only nine to the 5th, so that the amount may more properly be credited to the former day. The monthly total for, say, January is thus what falls between 9 A.M. on 1st January and 9 A.M. on 1st February.

The measuring glass is divided to hundredths of an inch—the highest line indicating ·50, that is fifty hundredths or half an inch. The amount should be entered on the Schedule thus: if up to say the sixth line in the glass as ·06, if up to the twenty-third line as ·23, if up to the thirtieth line as ·30, and so on, there being always two figures put down to the right of the decimal point. Care should be taken to avoid entering ·08 as simply 8, or ·30 as ·3, as this may cause confusion when adding the figures to get the total for the month.

When the fall exceeds one fill of the measuring glass it is necessary to measure it in portions, and each successive reading should be jotted down on the flyleaf of the note-book or other convenient place before the glass is emptied. Thus after heavy rain the amounts measured might be:—

·47
·42
·38
———
1·27

The total, 1·27, would be entered on the Schedule.

The glass must be held vertically or placed on a level surface when reading. A little uncertainty is sometimes caused by the upward curvature of the water where it touches the side of the glass, but the true reading is half way between the two apparent edges of the water surface. When there is nothing in the gauge a stroke (——) should be entered on the Schedule rather than the figure 0.

Snow or Hail is counted as Rainfall, and should be melted and measured as such. The upper part of the gauge may be taken indoors, and what is lying in it thawed. To save time, especially if snow or rain be then falling, it is convenient to add a measured quantity of warm water to the snow in the gauge, this quantity being afterwards deducted from the total to get the amount that has fallen. The depth of snow lying on the ground should be noted in the Remarks column.

In gauges, such as Flemings, in which a float and measuring rod is used, the rod should be removed or tied down below the level of the rim, except when a measurement is being taken, because if allowed to project above the gauge, it would prevent it catching the true amount of fall.

If a gauge is only read once a month this should be done on the morning of the 1st, and the amount entered to the previous month.

The Rain Gauge should be placed in an open situation, if possible with no elevated objects close to it, in any case trees, walls, etc., should never be nearer to the gauge in horizontal distance than their own height. The gauge should be firmly fixed with its rim 12 inches above ground; if surrounded by grass, care must be taken that it is never allowed to grow as high as the rim. The gauges at most Stations are five inches in diameter, though a few of larger or smaller size are also in use. A convenient way of fixing a gauge in position is to drive four stout wooden pegs from 12 to 18 inches long into the ground, one at each side of the gauge.

WIND, CLOUD, SUNSHINE, ETC.

WIND.

The direction and force of the Wind should be noted at 9 A.M. and 9 P.M. In confined situations where the true direction cannot be easily observed, it is best to ascertain this by watching the movement of smoke from chimneys, or even of the lower clouds. The force of the wind should be noted according to the scale given on the other side of the Schedule.

At Stations where an Anemometer is in use, the readings at 9 A.M. each day should be put down in the column provided, the values being entered to the previous day, as in the case of the Rainfall.

CLOUDS.

The amount of Cloud should be estimated on the scale, 0 to 10, 0 indicating a clear and 10 an overcast sky. Only the part of the sky over 30° above the horizon should be taken into account, as it is impossible to estimate the space covered by Clouds nearer the horizon. A convenient table for noting briefly the species of Cloud will be found on the other side of the Schedule. It is desirable to note, if possible, the direction from which the Clouds are moving. If there is more than one layer of clouds on the sky, they should be noted.

Thus, for example,

Cir. W. . .	4
Cum. Str. S.W.	2

would indicate that four-tenths of the sky was covered with cirrus moving from the West, and two-tenths with cumulus moving from the S.W.

SUNSHINE.

This column is primarily for those Stations where a Sunshine Recorder is kept; at other Stations, however, the Observer may note in it the number of hours each day that the sun shines with sufficient clearness to cast a distinct shadow.

RADIATION THERMOMETERS.

A MAXIMUM THERMOMETER, with its bulb blackened and enclosed in an outer glass bulb exhausted of air, is used at many stations to register the highest temperature in the sun. It should be mounted horizontally about four feet above ground with its bulb pointing south, and should be read and set at 9 P.M.

A MINIMUM THERMOMETER on grass is used to register the lowest radiation temperature at night. It should be placed on wooden supports a few inches above the surface of the grass. It may be read and set at 9 P.M., but in warm weather, as the spirit in this instrument is liable to evaporate when exposed to bright sunshine and to condense again in the upper part of the tube, it is better to read it at 9 A.M., to put it inside the screen during the day, and to set and replace it at 9 P.M.

THERMOMETERS UNDER GROUND.

These should be read at 9 A.M., and the readings entered on the day on which they are made.

REMARKS.

In the Remarks column should be noted all occurrences of Snow, Hail, or Heavy Rain; of Thunder, or Lightning, or both together; of all Auroras, Meteors, or Halos round the sun or moon; Fogs, Gales or Storms, and generally of all noteworthy Weather phenomena.

The table and additional lines on the back of the Schedule are for the use of those Observers who wish to record Notes connected with the changes of the Seasons, such as the growth of Crops, Fruit, etc., and the migrations of Birds; also the prevalence of Diseases in man, in the lower animals, and in plants. Such observations are often of great interest and utility when taken in conjunction with the ordinary Meteorological records.

DATES IN CONNECTION WITH THE PERIODICAL RETURN OF THE SEASONS.

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

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

The Society will be glad to receive any portions of the information indicated in this table that may come under the Observer's notice.

ADDITIONAL REMARKS.

THE SECRETARY,
Scottish Meteorological Society,
122 George Street,
EDINBURGH.

BOOK POST.

Halfpenny Stamp.

SCOTTISH METEOROLOGICAL SOCIETY.

Observations taken at Duthie Park Aberdeen, County of Aberdeen, During the MONTH of August 1909.

Lat. ____, Long. ____, Distance from Sea 2 miles. Height of Cistern of the Barometer above Mean Sea-Level 44 feet, above Ground 4 feet.

Diameter of Rain Gauge 5 inches. Height of Rim of Gauge above Ground 12 inches

The Hours of Observation are of Greenwich Time.

Days of Month.	BAROMETER. 9 A.M. Barometer. No. ____	BAROMETER. 9 A.M. Attached Thermometer	BAROMETER. 9 P.M. Barometer. No. ____	BAROMETER. 9 P.M. Attached Thermometer	SELF-REGISTERING THERMOMETERS, Read Daily, at 9 P.M. Protected in Screen, 4 feet above Ground. Max. No. ____	Min. No. ____	Black Bulb Max. in Sun. No. ____	Min. on Grass. No. ____	HYGROMETER. Dry No. ____ Wet No. ____ 9 A.M. Dry bulb.	Wet bulb.	9 P.M. Dry bulb.	Wet bulb.	RAIN. Amount at 9 A.M.	WIND. 9 A.M. Direction.	Force. Scale of 0—12.	9 P.M. Direction.	Force. Scale of 0—12.	Anemometer. 9 A.M.	CLOUDS. 9 A.M. Species and Direction.	Amount (0—10).	9 P.M. Species and Direction.	Amount (0—10).	SUNSHINE. Hours.	THERMOMETERS under Ground. 9 A.M. No. 3 ins.	No. 12 ins.	No. 22 ins.	No. 36 ins.	No. 48 ins.	GENERAL REMARKS. Occurrence of Snow, Hail, Thunder, Lightning, Fog, Gales, Meteors, Auroras, Remarkable Depression or Elevation of Barometer, etc. *Mention the hour at which Storms, including Thunder and Lightning, began and ended.*	Days of Month.
	inches.	°	inches.	°	°	°	°	°	°	°	°	°	inches.												°	°	°	°			
1	30.068	56			56.1	51.0			52	51			0.06																fair & fine	1
2	30.875	55			56.0	48.1			53	50			0.11																Do Do	2
3	30.025	54			55.2	47.0			55	51		?	0.40																Do Do	3
4	29.990	48			58.8	51.4			61	58.5																			Do Do	4
5	30.254	40			55.4	55.0			59.2	56																			Do Do	5
6	30.326	47			64.4	56.6			60	53			0.03																Do Do	6
7	30.150	56			76.4	55.4			69	61.5			0.00																Do Do	7
8	30.150	58	30.200		75.0	48.0			61	57																			Do Do	8
9	30.400	65			69.0	52.0			64	59.5																			Do Do	9
10	30.175	59			76.4	55.4			61.5	57																			Do Do	10
11	30.175	60			76.0	49.6			67	64																			fair some rain evening	11
12	30.009	53			70.0	48.8			67	61			.21																fair & fine all day	12
13	30.040	63	30.060	56	65.5	49.8			57	55																			fair & fine slight rain Pm	13
14	30.075	60			66.0	49.6			60	53.5																			fair & very fine	14
15	29.975	67			81.0	56.0			67.6	63.8			00.2																fair & fine	15
16	29.650	65			70.8	52.0			68.0	64.0			0.00																fair & very fine	16
17	29.750	65			63.0	52.0			57.0	53.0			0.11																Do Do	17
18	29.650	62			63.0	47.0			59.0	53.4			0.00																Do Do	18
19	29.650	60	29.650	57	61.5	41.2			58.0	56.3			0.00																Do rain afternoon	19
20	29.600	62			62.2	46.0			58.0	52.5			0.00																fair	20
21	29.500	60			65.0	46.0			57.2	51.6			0.28																fair Dull	21
22	29.650	59			68.0	45.8			53.0	49.5			0.00																rain	22
23	29.720	53			60.0	48.0			55.0	53.6			0.00																heavy rain	23
24	29.610	58			58.0	53.0			55.0	54.0			0.32																some rain then fair	24
25	29.700	58			61.0	52.0			54.0	52.0			02.0																fair bright & fine	25
26	29.955	59			59.0	48.0			49.3	46.7			0.10																	26
27	30.025	60			61.0	47.0			51.5	53.0			0.00																Slight rain fair Afternoon	27
28	30.050	58			63.5	50.4			52.1	51.4			0.08																heavy rain fair Afternoon	28
29	30.025	53			65.0	47.5			54.8	52.8			0.39																fair	29
30	29.775	54			65.0	42.0			57.6	47.0			0.00																Ubid Stormy day	30
31	29.730	57			56.0	44.8			50.0	45.6			0.08																	31
Sums.	13138	14			145	156			143	128			4																	
	29.523	336			622	29.8			7	548.4			2.09																	
Means.	29920	576			65.2	49.7			58.0	54.8	55.1																			
Corrections for Instrumental Errors.						+10			3.2		2.8																			
Corrections for Diurnal Range.																														
Corrected Means																														

NOTATION USED IN GENERAL REMARKS.

a. *denotes* aurora.
d. ,, drizzling rain.
f. ,, fog.
fr. ,, frost.
h.-fr. ,, hoar-frost.
h. ,, haze.
hl. ,, hail.
l. ,, lightning.
lu. co. ,, lunar corona.
lu. ha. ,, lunar halo.
m. ,, mist.
p. ,, passing showers.
r. ,, rain.
r.² ,, heavy rain.
sl. ,, sleet.
sn. ,, snow.
so. ha. ,, solar halo.
q. ,, squall.
q.² ,, violent squalls.
t. ,, thunder.
t. s. ,, thunder-storm.

CLOUDS.

HIGH CLOUDS.

Cirrus, . . . cir.
Cirro-stratus, . . cir.-str.
Cirro-cumulus, . . cir.-cum.

MIDDLE CLOUDS.

Strato-cirrus, . . str.-cir.
Cumulo-cirrus, . . cum.-cir.

LOWER CLOUDS.

Strato-cumulus, . . str.-cum.
Cumulus, . . . cum.
Cumulo-nimbus, . . cum.-nim.
Nimbus, . . . nim.
Stratus, . . . str.

BEAUFORT SCALE FOR ESTIMATING FORCE OF WIND—(0—12).

FORCE.		FORCE.		FORCE.	
0	Calm.	5	Fresh Breeze.	9	Strong Gale.
1	Light Air.	6	Strong Breeze.	10	Whole Gale.
2	Light Breeze.	7	Moderate Gale.	11	Storm.
3	Gentle Breeze.	8	Fresh Gale.	12	Hurricane.
4	Moderate Breeze.				

BAROMETER. Corrected Mean at 9 A.M., *minus* Correction for Temp. = ____ = 29.842

Corrected Mean at 9 P.M., *minus* Correction for Temp. = ____ = ____

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

Correction for height, feet above Mean Sea-level, = + 48

Mean, reduced to 32°, and Sea-level, = 29.890

Highest Reading, corrected for Index error, on the th, = ____

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

Difference, or **Monthly Range,** = ____

S.-R. THERMOMETER, (in shade) **Highest in Month,** corrected for Index Errors, on the 15 th, = 81

Lowest in Month, corrected for Index errors, on the 9 th, = 47

Difference, or **Monthly Range,** = 34

Mean of all the Highest, = 65.2

Mean of all the Lowest, = 50.7

Difference, or **Mean Daily Range,** = 14.5

Mean Temperature of Month, ½ (Mean Max. + Mean Min.), = 58.0

S.-R. THERMOMETER, Min. on Grass, Lowest in Month, = ____

,, ,, Mean, = ____

Black Bulb, Max. in Sun, Highest in Month, = ____

HYGROMETER, Dry Bulb, Mean of A.M. and P.M. Readings, = 56.6 58.6

Wet Bulb, Mean of A.M. and P.M. Readings, = 53.6 54.8

Computed **Temperature of Dew-Point,** = ____

Do. **Elastic Force of Vapour,** = .373388

Do. **Relative Humidity** (Saturation = 100), = 81 80

RAIN fell on 16 **Days; Amount in Inches,** = 2.09

WIND. SUMMARY.

Direction.	N	NE	E	SE	S	SW	W	NW	Calm or Variable.	Mean Force 0—12.
A.M.										
P.M.										
Sum.										

Observations made and Return verified by ____

(Signed) Peter Harper

N.B.—**Rain** to be measured at 9 A.M. and the amount entered to the previous day.

See instructions on back of Schedule.

INSTRUCTIONS FOR TAKING METEOROLOGICAL OBSERVATIONS.

In order to insure uniformity in the observations made at the Observing Stations of the Scottish Meteorological Society, the Council request the Observers to adopt the methods described below.

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The Council recommend that Observations be made precisely at 9 A.M. and 9 P.M. (Greenwich Time). At both hours the Barometer and Dry and Wet Bulb Thermometers should be read, and notes made of the Wind, Cloud, and general weather. The Rain Gauge should be read at 9 A.M. only, and the Maximum and Minimum Self-registering Thermometers at 9 P.M. only.

It is hoped that every effort will be made to insure punctuality. When, however, an observation is taken not at the usual hours, it is requested that this be stated in a note on the Schedule.

All instruments used should be compared with a certified standard; Observers are requested to communicate with the Secretary before purchasing new or repairing old instruments.

BAROMETER.

The Barometer should be hung in a good light and in a room not exposed to sudden changes of temperature. The upper part of the scale must not be higher than the level of the observer's eye, and the instrument must hang vertically. Barometers should not be moved from their places except by persons accustomed to the work, as they are very liable to get air into the mercury column when improperly handled. Mercurial barometers mounted in metal cases are the only sort suitable for the accurate measurement of atmospheric pressure.

FORTIN BAROMETER.—In setting this instrument the level of the mercury in the glass cistern has first to be adjusted by turning the screw below the cistern till the surface of the mercury just touches the ivory point which projects downwards from the cover of the cistern. A modification of the Fortin pattern is used at several of the Society's Stations, in which the adjustment is made by turning the screw until the zero line on an ivory rod which projects through the cover of the cistern is brought to coincide with the lines on the uprights beside it. In either pattern this cistern adjustment must be made before the Vernier at the top of the mercury column is set.

In the BOARD OF TRADE pattern of barometer no adjustment of the cistern is required, and the Observer can at once proceed to set the Vernier, which in all three classes of instrument is done as follows:—

First see that the Vernier is raised above the mercury, then lower it till its front and back edge both just touch, that is, form a tangent to, the highest part of the mercury column. The top of the mercury is usually slightly convex, and care must be taken not to bring the Vernier down to where the front of the mercury touches the glass, which is below the real top of the column.

The attached thermometer should be read and noted before setting the barometer, as its readings may be affected by heat from the Observer's body while handling the instrument.

The errors most frequently made in reading the barometer are mistakes of 1·000 inch, 0·100 inch, and 0·050 inch; that is to say, instead of 29·365 one of the following is sometimes set down—viz. 30·365, 29·265, or 29·315. Experience having shown that even the best Observers occasionally make these mistakes, the reading, after it is writen down, should be compared again with the scale.

STEVENSON SCREEN.

The Maximum, Minimum, Dry Bulb, and Wet Bulb Thermometers should be placed in a louvred Stevenson Screen standing over grass and with its door facing north. The Dry and Wet Bulb Thermometers may be conveniently attached to upright laths near the front of the Screen, and the Maximum and Minimum Thermometers to others farther back. The height of the Screen should be such that the bulbs of the Dry and Wet Thermometers are four feet above the ground. The Screen should be painted white inside and out.

MAXIMUM AND MINIMUM THERMOMETERS.

In order that the MAXIMUM THERMOMETER may register the highest temperature of the day, the column of mercury is disconnected from the mercury in the bulb either by an air-bubble in the column (Phillip's pattern), or by the narrowing of the tube near the bulb (Negretti and Zambra's pattern). In either case the instrument is set by holding it vertically, bulb downwards, and gently shaking and tapping it so as to send the portion of the column that remained at the highest point attained back towards the bulb.

The MINIMUM THERMOMETER registers the lowest temperature by an index enclosed in the column of spirit which is drawn towards the bulb as the temperature falls, but remains stationary during any rise of temperature. The lowest reading is therefore the position of the end of the index furthest from the bulb. The instrument is set by inclining it bulb upwards till the index slips down to the end of the column of spirit. Care must be taken not to force any part of the index beyond the end of the spirit. Should this occur, however, or should portions of the spirit get detached and lodge in the upper part of the tube, it is generally possible to set the instrument right again by grasping it near the end furthest from the bulb and giving several rapid vertical swings at arm's length, so as to drive the spirit and index towards the bulb by centrifugal force.

Both Maximum and Minimum should be read and set at 9 P.M. The readings should be written down before the Thermometers are touched; and after setting, both should agree very nearly with the Dry Bulb temperature at that hour. Any difference from the Dry Bulb of more than a degree may be regarded by the Observer as an indication either that the instrument is not properly set, or that it is out of order.

DRY AND WET BULB THERMOMETERS.

The Hygrometer in use at the Society's Stations consists of two thermometers—a Dry and a Wet Bulb—of similar form, and usually mounted on one frame. The bulbs should project at least an inch from the frame, and the Wet Bulb be covered with muslin and connected by strands of cotton with the water cistern. This cistern should be placed an inch or two below the level of the bulbs and at the side of the Wet Bulb furthest from the Dry Bulb; it should not stand directly under the Wet Bulb. Muslins and strands are supplied to most stations from the Society's office, and should be renewed at least once a month. In putting on a fresh muslin care should be taken to touch it as little as may be with the fingers. In frosty weather the strands do not convey water to the muslin, but an accurate observation can generally be insured by soaking the Wet Bulb in water a quarter of an hour before the observation, as from the film of ice thus formed on the muslin evaporation goes on in the same way as from the wet muslin under ordinary circumstances.

RAIN GAUGE.

The Rain Gauge should be read at 9 A.M. each day, and the amount entered to the *previous day on the Schedule*: thus the quantity measured at 9 A.M. on the 5th should be put down on the line containing the observations of the 4th of the month, since out of the twenty-four hours ending at 9 A.M. on 5th, fifteen belong to the 4th and only nine to the 5th, so that the amount may more properly be credited to the former day. The monthly total for, say, January is thus what falls between 9 A.M. on 1st January and 9 A.M. on 1st February.

The measuring glass is divided to hundredths of an inch—the highest line indicating ·50, that is fifty hundredths or half an inch. The amount should be entered on the Schedule thus: if up to say the sixth line in the glass as ·06, if up to the twenty-third line as ·23, if up to the thirtieth line as ·30, and so on, there being always two figures put down to the right of the decimal point. Care should be taken to avoid entering ·08 as simply 8, or ·30 as ·3, as this may cause confusion when adding the figures to get the total for the month.

When the fall exceeds one fill of the measuring glass it is necessary to measure it in portions, and each successive reading should be jotted down on the flyleaf of the note-book or other convenient place before the glass is emptied. Thus after heavy rain the amounts measured might be:—

·47
·42
·38
1·27

The total, 1·27, would be entered on the Schedule.

The glass must be held vertically or placed on a level surface when reading. A little uncertainty is sometimes caused by the upward curvature of the water where it touches the side of the glass, but the true reading is half way between the two apparent edges of the water surface. When there is nothing in the gauge a stroke (——) should be entered on the Schedule rather than the figure 0.

Snow or **Hail** is counted as Rainfall, and should be melted and measured as such. The upper part of the gauge may be taken indoors, and what is lying in it thawed. To save time, especially if snow or rain be then falling, it is convenient to add a measured quantity of warm water to the snow in the gauge, this quantity being afterwards deducted from the total to get the amount that has fallen. The depth of snow lying on the ground should be noted in the Remarks column.

In gauges, such as Flemings, in which a float and measuring rod is used, the rod should be removed or tied down below the level of the rim, except when a measurement is being taken, because if allowed to project above the gauge, it would prevent it catching the true amount of fall.

If a gauge is only read once a month this should be done on the morning of the 1st, and the amount entered to the previous month.

The Rain Gauge should be placed in an open situation, if possible with no elevated objects close to it, in any case trees, walls, etc., should never be nearer to the gauge in horizontal distance than their own height. The gauge should be firmly fixed with its rim 12 inches above ground; if surrounded by grass, care must be taken that it is never allowed to grow as high as the rim. The gauges at most Stations are five inches in diameter, though a few of larger or smaller size are also in use. A convenient way of fixing a gauge in position is to drive four stout wooden pegs from 12 to 18 inches long into the ground, one at each side of the gauge.

WIND, CLOUD, SUNSHINE, ETC.

WIND.

The direction and force of the Wind should be noted at 9 A.M. and 9 P.M. In confined situations where the true direction cannot be easily observed, it is best to ascertain this by watching the movement of smoke from chimneys, or even of the lower clouds. The force of the wind should be noted according to the scale given on the other side of the Schedule.

At Stations where an Anemometer is in use, the readings at 9 A.M. each day should be put down in the column provided, the values being entered to the previous day, as in the case of the Rainfall.

CLOUDS.

The amount of Cloud should be estimated on the scale, 0 to 10, 0 indicating a clear and 10 an overcast sky. Only the part of the sky over 30° above the horizon should be taken into account, as it is impossible to estimate the space covered by Clouds nearer the horizon. A convenient table for noting briefly the species of Cloud will be found on the other side of the Schedule. It is desirable to note, if possible, the direction from which the Clouds are moving. If there is more than one layer of clouds on the sky, they should be noted.

Thus, for example,

Cir. W. . .	4
Cum. Str. S.W.	2

would indicate that four-tenths of the sky was covered with cirrus moving from the West, and two-tenths with cumulus moving from the S.W.

SUNSHINE.

This column is primarily for those Stations where a Sunshine Recorder is kept; at other Stations, however, the Observer may note in it the number of hours each day that the sun shines with sufficient clearness to cast a distinct shadow.

RADIATION THERMOMETERS.

A MAXIMUM THERMOMETER, with its bulb blackened and enclosed in an outer glass bulb exhausted of air, is used at many stations to register the highest temperature in the sun. It should be mounted horizontally about four feet above ground with its bulb pointing south, and should be read and set at 9 P.M.

A MINIMUM THERMOMETER on grass is used to register the lowest radiation temperature at night. It should be placed on wooden supports a few inches above the surface of the grass. It may be read and set at 9 P.M., but in warm weather, as the spirit in this instrument is liable to evaporate when exposed to bright sunshine and to condense again in the upper part of the tube, it is better to read it at 9 A.M., to put it inside the screen during the day, and to set and replace it at 9 P.M.

THERMOMETERS UNDER GROUND.

These should be read at 9 A.M., and the readings entered on the day on which they are made.

REMARKS.

In the Remarks column should be noted all occurrences of Snow, Hail, or Heavy Rain; of Thunder, or Lightning, or both together; of all Auroras, Meteors, or Halos round the sun or moon; Fogs, Gales or Storms, and generally of all noteworthy Weather phenomena.

The table and additional lines on the back of the Schedule are for the use of those Observers who wish to record Notes connected with the changes of the Seasons, such as the growth of Crops, Fruit, etc., and the migrations of Birds; also the prevalence of Diseases in man, in the lower animals, and in plants. Such observations are often of great interest and utility when taken in conjunction with the ordinary Meteorological records.

DATES IN CONNECTION WITH THE PERIODICAL RETURN OF THE SEASONS.

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

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

The Society will be glad to receive any portions of the information indicated in this table that may come under the Observer's notice.

ADDITIONAL REMARKS.

BOOK POST.

THE SECRETARY,
Scottish Meteorological Society,
122 *George Street,*
EDINBURGH.

Halfpenny Stamp.

SCOTTISH METEOROLOGICAL SOCIETY.

Observations taken at Duthie Park Aberdeen, County of Aberdeen, During the MONTH of September 1909.

Lat. ____, Long. ____, Distance from Sea 2 miles. Height of Cistern of the Barometer above Mean Sea-Level 44 feet, above Ground 4 feet.

Diameter of Rain Gauge 8" inches. Height of Rim of Gauge above Ground 12 inches on grass

The Hours of Observation are of Greenwich Time.

Days of Month.	BAROMETER. 9 A.M. Barometer. No.	9 A.M. Attached Thermometer	9 P.M. Barometer. No.	9 P.M. Attached Thermometer	SELF-REGISTERING THERMOMETERS, Read Daily, at 9 P.M. Protected in Screen, 4 feet above Ground. Max. No.	Min. No.	Black Bulb, Max. in Sun. No.	Min. on Grass. No.	HYGROMETER. Dry No. ____ Wet No. ____ 9 A.M. Dry bulb.	9 A.M. Wet bulb.	9 P.M. Dry bulb.	9 P.M. Wet bulb.	RAIN. Amount at 9 A.M.	WIND. 9 A.M. Direction.	9 A.M. Force. Scale of 0—12.	9 P.M. Direction.	9 P.M. Force. Scale of 0—12.	Anemometer. 9 A.M.	CLOUDS. 9 A.M. Species and Direction.	9 A.M. Amount (0—10).	9 P.M. Species and Direction.	9 P.M. Amount (0—10).	SUNSHINE. Hours.	THERMOMETERS under Ground. 9 A.M. No. 3 ins.	No. 12 ins.	No. 22 ins.	No. 36 ins.	No. 48 ins.	GENERAL REMARKS. Occurrence of Snow, Hail, Thunder, Lightning, Fog, Gales, Meteors, Auroras, Remarkable Depression or Elevation of Barometer, etc. *Mention the hour at which Storms, including Thunder and Lightning, began and ended.*	Days of Month.
	inches.	°	inches.	°	°	°	°	°	°	°	°	°	inches.												°	°	°	°	°		
1	29.780	56			56.0	44.8			51.0	47.0			0.10	NW	6				NW	6										fair windy all day Clear PM	1
2	29.925	52			63.6	38.8			49.8	45.8			0.03						ZP	6										fair mild fine	2
3	30.030	57			37.1	44.0			54.0	47.0			0.00						ZP	2										Do Do Do	3
4	29.700	57			58.0	46.8			54.1	50.4			0.09						SW	2										Do Do Do	4
5	29.925	57			66.0	49.2			62.0	47.1			0.12						NW	4										fair & fine all day	5
6	29.790	58			66.0	46.0			58.2	54.8			0.09						SW	4										been rain fair & a m	6
7	29.550	56			54.6	45.0			50.0	43.0			0.22						NW	6										showers mild day	7
8	30.000	53			61.0	43.0			50.0	47.0			00.2						NW	5										showers fair & fine	8
9	30.000	56			65.0	43.0			51.0	51.6			0.00						NW	2										Do Do Do	9
10	30.200	57			58.0	46.0			53.0	53.0			0.00						S	2										fog fair & fine	10
11	30.200	58			57.0	50.0			55.0	53.2			0.00						SE	2										fair very mild raing a m	11
12	30.025	57			57.1	42.8			53.0	52.0			0.18						NW	2										fair	12
13	30.300	56			58.0	37.4			47.0	40.0			0.00						NW	2										fair & very fine	13
14	30.460	52			58.3	36.0			45.4	43.8			0.00						SW	2										Do. Do Do	14
15	30.350	53			41.0	39.0			40.6	41.4			0.00						SW	2										Do Do Do	15
16	30.300	55			61.0	37.0			52.0	48.2			0.02						SE	4										very dull Damp	16
17	30.245	53			61.0	40.8			54.8	54.0			0.00						SE	2										Slight fog fair mild	17
18	30.175	56			63.8	51.0	x		54.6	53.0			0.10						S	2										Do Do Do	18
19	30.175	57			55.3	44.0			54.0	53.5			0.50						SW	2										breezy fair cool	19
20	30.051	55			56.0	45.0			50.4	48.2			0.02						NW	6										dull Damp some rain	20
21	29.890	56			50.0	45.2			52.2	51.2			0.28						NW	4										dull been rain	21
22	29.400	54			52.0	48.6			51.0	50.0			0.01						S	2										dull very damp	22
23	30.175	56			56.0	48.0			52.6	51.8			0.02						SW	2										fog all day	23
24	30.260	52			55.2	52.0			52.8	51.8			0.15						NW	6										Do Do rain	24
25	30.250	58			54.0	47.4			54.0	52.6			0.03						N	4										fair damp heavy dew	25
26	30.305	58			54.0	48.3			56.0	49.0			0.00						S	2										fair damp dew	26
27	30.258	58			54.0	41.0			52.0	50.0			0.05						S	2										damp light rain fog	27
28	30.100	55			57.0	41.5			48.8	48.0			0.00						SE	2										Dull damp heavy dew	28
29	30.025	57			57.0	44.5			52.8	52.2			0.00						NE	2										Do Do Do	29
30	29.900	58			57.0	47.5			50.4	49.5			0.00						N	2											30
31																															31
Sums.	894	17			143	157			97	118			6							93											
	2146	17			382	416			492	491			2.03																		
Means.	30.02	55.9			57.9	44.4			51.4	49.3	50.2									2.1											
Corrections for Instrumental Errors.	−.010				✓	✓			2.1		2.1																				
Corrections for Diurnal Range.						4.0																									
Corrected Means																															

NOTATION USED IN GENERAL REMARKS.

a. denotes aurora. d. ,, drizzling rain. f. ,, fog. fr. ,, frost. h.-fr. ,, hoar-frost. h. ,, haze. hl. ,, hail. l. ,, lightning. lu. co. ,, lunar corona. lu. ha. ,, lunar halo. m. ,, mist. p. ,, passing showers. r. ,, rain. r.² ,, heavy rain. sl. ,, sleet. sn. ,, snow. so. ha. ,, solar halo. q. ,, squall. q.² ,, violent squalls. t. ,, thunder. t. s. ,, thunder-storm.

CLOUDS.

High Clouds: Cirrus, cir. Cirro-stratus, cir.-str. Cirro-cumulus, cir.-cum.

Middle Clouds: Strato-cirrus, str.-cir. Cumulo-cirrus, cum.-cir.

Lower Clouds: Strato-cumulus, str.-cum. Cumulus, cum. Cumulo-nimbus, cum.-nim. Nimbus, nim. Stratus, str.

BEAUFORT SCALE FOR ESTIMATING FORCE OF WIND—(0–12).

Force.		Force.		Force.	
0	Calm.	5	Fresh Breeze.	9	Strong Gale.
1	Light Air.	6	Strong Breeze.	10	Whole Gale.
2	Light Breeze.	7	Moderate Gale.	11	Storm.
3	Gentle Breeze.	8	Fresh Gale.	12	Hurricane.
4	Moderate Breeze.				

BAROMETER. Corrected Mean at 9 A.M., *minus* Correction for Temp. = ... −.74 = 29.998

Corrected Mean at 9 P.M., *minus* Correction for Temp. = ... = ____

Mean at Station, corrected, and at 32°, ... = 29.988

Correction for height, 44 feet above Mean Sea-level, ... = +.049

Mean, reduced to 32°, and Sea-level, ... = 30.037

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

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

Difference, or **Monthly Range,** ..... = ____

S.-R. THERMOMETER, (in shade) **Highest in Month,** corrected for Index Errors, on the 5th, 6 ..... = 66

Lowest in Month, corrected for Index errors, on the 4 th, ... = 37

Difference, or **Monthly Range,** ..... = 29

Mean of all the Highest, ... = 57.9

Mean of all the Lowest, ... = 45.4

Difference, or **Mean Daily Range,** ..... = 12.5

Mean Temperature of Month, ½ (Mean Max. + Mean Min.), ... = 51.7

S.-R. THERMOMETER, Min. on Grass, Lowest in Month, ... = ____

,, ,, Mean, ... = ____

Black Bulb, Max. in Sun, Highest in Month, ... = ____

HYGROMETER, Dry Bulb, Mean of A.M. and P.M. Readings, ... = 50.8

Wet Bulb, Mean of A.M. and P.M. Readings, ... = 48.7

Computed **Temperature of Dew-Point,** ..... = ____

Do. **Elastic Force of Vapour,** ..... = .349

Do. **Relative Humidity** (Saturation = 100), = 86

RAIN fell on 18 **Days; Amount in Inches,** ..... = 2.03

WIND. SUMMARY.

Direction.	N	NE	E	SE	S	SW	W	NW	Calm or Variable.	Mean Force 0—12.
A.M.	3	1		4	5	6	2	9		
P.M.										
Sum.	6	2	0	8	10	12	4	18	0	3.1

Observations made and Return verified by Peter Hampson

(*Signed*) ____

N.B.—**Rain** to be measured at 9 A.M. and the amount entered to the previous day.

See instructions on back of Schedule.

INSTRUCTIONS FOR TAKING METEOROLOGICAL OBSERVATIONS.

In order to insure uniformity in the observations made at the Observing Stations of the Scottish Meteorological Society, the Council request the Observers to adopt the methods described below.

HOURS OF OBSERVATION.

The Council recommend that Observations be made precisely at 9 A.M. and 9 P.M. (Greenwich Time). At both hours the Barometer and Dry and Wet Bulb Thermometers should be read, and notes made of the Wind, Cloud, and general weather. The Rain Gauge should be read at 9 A.M. only, and the Maximum and Minimum Self-registering Thermometers at 9 P.M. only.

It is hoped that every effort will be made to insure punctuality. When, however, an observation is taken not at the usual hours, it is requested that this be stated in a note on the Schedule.

All instruments used should be compared with a certified standard; Observers are requested to communicate with the Secretary before purchasing new or repairing old instruments.

BAROMETER.

The Barometer should be hung in a good light and in a room not exposed to sudden changes of temperature. The upper part of the scale must not be higher than the level of the observer's eye, and the instrument must hang vertically. Barometers should not be moved from their places except by persons accustomed to the work, as they are very liable to get air into the mercury column when improperly handled. Mercurial barometers mounted in metal cases are the only sort suitable for the accurate measurement of atmospheric pressure.

FORTIN BAROMETER.—In setting this instrument the level of the mercury in the glass cistern has first to be adjusted by turning the screw below the cistern till the surface of the mercury just touches the ivory point which projects downwards from the cover of the cistern. A modification of the Fortin pattern is used at several of the Society's Stations, in which the adjustment is made by turning the screw until the zero line on an ivory rod which projects through the cover of the cistern is brought to coincide with the lines on the uprights beside it. In either pattern this cistern adjustment must be made before the Vernier at the top of the mercury column is set.

In the BOARD OF TRADE pattern of barometer no adjustment of the cistern is required, and the Observer can at once proceed to set the Vernier, which in all three classes of instrument is done as follows:—

First see that the Vernier is raised above the mercury, then lower it till its front and back edge both just touch, that is, form a tangent to, the highest part of the mercury column. The top of the mercury is usually slightly convex, and care must be taken not to bring the Vernier down to where the front of the mercury touches the glass, which is below the real top of the column.

The attached thermometer should be read and noted before setting the barometer, as its readings may be affected by heat from the Observer's body while handling the instrument.

The errors most frequently made in reading the barometer are mistakes of 1·000 inch, 0·100 inch, and 0·050 inch; that is to say, instead of 29·365 one of the following is sometimes set down—viz. 30·365, 29·265, or 29·315. Experience having shown that even the best Observers occasionally make these mistakes, the reading, after it is writen down, should be compared again with the scale.

STEVENSON SCREEN.

The Maximum, Minimum, Dry Bulb, and Wet Bulb Thermometers should be placed in a louvred Stevenson Screen standing over grass and with its door facing north. The Dry and Wet Bulb Thermometers may be conveniently attached to upright laths near the front of the Screen, and the Maximum and Minimum Thermometers to others farther back. The height of the Screen should be such that the bulbs of the Dry and Wet Thermometers are four feet above the ground. The Screen should be painted white inside and out.

MAXIMUM AND MINIMUM THERMOMETERS.

In order that the MAXIMUM THERMOMETER may register the highest temperature of the day, the column of mercury is disconnected from the mercury in the bulb either by an air-bubble in the column (Phillip's pattern), or by the narrowing of the tube near the bulb (Negretti and Zambra's pattern). In either case the instrument is set by holding it vertically, bulb downwards, and gently shaking and tapping it so as to send the portion of the column that remained at the highest point attained back towards the bulb.

The MINIMUM THERMOMETER registers the lowest temperature by an index enclosed in the column of spirit which is drawn towards the bulb as the temperature falls, but remains stationary during any rise of temperature. The lowest reading is therefore the position of the end of the index furthest from the bulb. The instrument is set by inclining it bulb upwards till the index slips down to the end of the column of spirit. Care must be taken not to force any part of the index beyond the end of the spirit. Should this occur, however, or should portions of the spirit get detached and lodge in the upper part of the tube, it is generally possible to set the instrument right again by grasping it near the end furthest from the bulb and giving several rapid vertical swings at arm's length, so as to drive the spirit and index towards the bulb by centrifugal force.

Both Maximum and Minimum should be read and set at 9 P.M. The readings should be written down before the Thermometers are touched; and after setting, both should agree very nearly with the Dry Bulb temperature at that hour. Any difference from the Dry Bulb of more than a degree may be regarded by the Observer as an indication either that the instrument is not properly set, or that it is out of order.

DRY AND WET BULB THERMOMETERS.

The Hygrometer in use at the Society's Stations consists of two thermometers—a Dry and a Wet Bulb—of similar form, and usually mounted on one frame. The bulbs should project at least an inch from the frame, and the Wet Bulb be covered with muslin and connected by strands of cotton with the water cistern. This cistern should be placed an inch or two below the level of the bulbs and at the side of the Wet Bulb furthest from the Dry Bulb; it should not stand directly under the Wet Bulb. Muslins and strands are supplied to most stations from the Society's office, and should be renewed at least once a month. In putting on a fresh muslin care should be taken to touch it as little as may be with the fingers. In frosty weather the strands do not convey water to the muslin, but an accurate observation can generally be insured by soaking the Wet Bulb in water a quarter of an hour before the observation, as from the film of ice thus formed on the muslin evaporation goes on in the same way as from the wet muslin under ordinary circumstances.

RAIN GAUGE.

The Rain Gauge should be read at 9 A.M. each day, and the amount entered to the *previous day on the Schedule*: thus the quantity measured at 9 A.M. on the 5th should be put down on the line containing the observations of the 4th of the month, since out of the twenty-four hours ending at 9 A.M. on 5th, fifteen belong to the 4th and only nine to the 5th, so that the amount may more properly be credited to the former day. The monthly total for, say, January is thus what falls between 9 A.M. on 1st January and 9 A.M. on 1st February.

The measuring glass is divided to hundredths of an inch—the highest line indicating ·50, that is fifty hundredths or half an inch. The amount should be entered on the Schedule thus: if up to say the sixth line in the glass as ·06, if up to the twenty-third line as ·23, if up to the thirtieth line as ·30, and so on, there being always two figures put down to the right of the decimal point. Care should be taken to avoid entering ·08 as simply 8, or ·30 as ·3, as this may cause confusion when adding the figures to get the total for the month.

When the fall exceeds one fill of the measuring glass it is necessary to measure it in portions, and each successive reading should be jotted down on the flyleaf of the note-book or other convenient place before the glass is emptied. Thus after heavy rain the amounts measured might be:—

·47
·42
·38
———
1·27

The total, 1·27, would be entered on the Schedule.

The glass must be held vertically or placed on a level surface when reading. A little uncertainty is sometimes caused by the upward curvature of the water where it touches the side of the glass, but the true reading is half way between the two apparent edges of the water surface. When there is nothing in the gauge a stroke (——) should be entered on the Schedule rather than the figure 0.

Snow or **Hail** is counted as Rainfall, and should be melted and measured as such. The upper part of the gauge may be taken indoors, and what is lying in it thawed. To save time, especially if snow or rain be then falling, it is convenient to add a measured quantity of warm water to the snow in the gauge, this quantity being afterwards deducted from the total to get the amount that has fallen. The depth of snow lying on the ground should be noted in the Remarks column.

In gauges, such as Flemings, in which a float and measuring rod is used, the rod should be removed or tied down below the level of the rim, except when a measurement is being taken, because if allowed to project above the gauge, it would prevent it catching the true amount of fall.

If a gauge is only read once a month this should be done on the morning of the 1st, and the amount entered to the previous month.

The Rain Gauge should be placed in an open situation, if possible with no elevated objects close to it, in any case trees, walls, etc., should never be nearer to the gauge in horizontal distance than their own height. The gauge should be firmly fixed with its rim 12 inches above ground; if surrounded by grass, care must be taken that it is never allowed to grow as high as the rim. The gauges at most Stations are five inches in diameter, though a few of larger or smaller size are also in use. A convenient way of fixing a gauge in position is to drive four stout wooden pegs from 12 to 18 inches long into the ground, one at each side of the gauge.

WIND, CLOUD, SUNSHINE, ETC.

WIND.

The direction and force of the Wind should be noted at 9 A.M. and 9 P.M. In confined situations where the true direction cannot be easily observed, it is best to ascertain this by watching the movement of smoke from chimneys, or even of the lower clouds. The force of the wind should be noted according to the scale given on the other side of the Schedule.

At Stations where an Anemometer is in use, the readings at 9 A.M. each day should be put down in the column provided, the values being entered to the previous day, as in the case of the Rainfall.

CLOUDS.

The amount of Cloud should be estimated on the scale, 0 to 10, 0 indicating a clear and 10 an overcast sky. Only the part of the sky over 30° above the horizon should be taken into account, as it is impossible to estimate the space covered by Clouds nearer the horizon. A convenient table for noting briefly the species of Cloud will be found on the other side of the Schedule. It is desirable to note, if possible, the direction from which the Clouds are moving. If there is more than one layer of clouds on the sky, they should be noted.

Thus, for example,

Cir. W.	4
Cum. Str. S.W.	2

would indicate that four-tenths of the sky was covered with cirrus moving from the West, and two-tenths with cumulus moving from the S.W.

SUNSHINE.

This column is primarily for those Stations where a Sunshine Recorder is kept; at other Stations, however, the Observer may note in it the number of hours each day that the sun shines with sufficient clearness to cast a distinct shadow.

RADIATION THERMOMETERS.

A MAXIMUM THERMOMETER, with its bulb blackened and enclosed in an outer glass bulb exhausted of air, is used at many stations to register the highest temperature in the sun. It should be mounted horizontally about four feet above ground with its bulb pointing south, and should be read and set at 9 P.M.

A MINIMUM THERMOMETER on grass is used to register the lowest radiation temperature at night. It should be placed on wooden supports a few inches above the surface of the grass. It may be read and set at 9 P.M., but in warm weather, as the spirit in this instrument is liable to evaporate when exposed to bright sunshine and to condense again in the upper part of the tube, it is better to read it at 9 A.M., to put it inside the screen during the day, and to set and replace it at 9 P.M.

THERMOMETERS UNDER GROUND.

These should be read at 9 A.M., and the readings entered on the day on which they are made.

REMARKS.

In the Remarks column should be noted all occurrences of Snow, Hail, or Heavy Rain; of Thunder, or Lightning, or both together; of all Auroras, Meteors, or Halos round the sun or moon; Fogs, Gales or Storms, and generally of all noteworthy Weather phenomena.

The table and additional lines on the back of the Schedule are for the use of those Observers who wish to record Notes connected with the changes of the Seasons, such as the growth of Crops, Fruit, etc., and the migrations of Birds; also the prevalence of Diseases in man, in the lower animals, and in plants. Such observations are often of great interest and utility when taken in conjunction with the ordinary Meteorological records.

DATES IN CONNECTION WITH THE PERIODICAL RETURN OF THE SEASONS.

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

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

The Society will be glad to receive any portions of the information indicated in this table that may come under the Observer's notice.

ADDITIONAL REMARKS.

THE SECRETARY,
Scottish Meteorological Society,
122 George Street,
EDINBURGH.

BOOK POST.

Halfpenny Stamp.

SCOTTISH METEOROLOGICAL SOCIETY.

Observations taken at Duthie Park Aberdeen, County of Aberdeen, During the MONTH of October 1909.

Lat. ____, Long. ____, Distance from Sea 2 miles. Height of Cistern of the Barometer above Mean Sea-Level 44 feet, above Ground 4 feet.

Diameter of Rain Gauge 5" inches. Height of Rim of Gauge above Ground 12 inches

The Hours of Observation are of Greenwich Time.

Days of Month.	BAROMETER. 9 A.M. Barometer. No. ____	9 A.M. Attached Thermometer	9 P.M. Barometer. No. ____	9 P.M. Attached Thermometer	SELF-REGISTERING THERMOMETERS, Read Daily, at 9 P.M. Protected in Screen, 4 feet above Ground. Max. No.	Min. No.	Black Bulb Max. in Sun. No.	Min. on Grass. No.	HYGROMETER. Dry No. ____ Wet No. ____ 9 A.M. Dry bulb.	9 A.M. Wet bulb.	9 P.M. Dry bulb.	9 P.M. Wet bulb.	RAIN. Amount at 9 A.M.	WIND. 9 A.M. Direction.	9 A.M. Force. Scale of 0—12.	9 P.M. Direction.	9 P.M. Force. Scale of 0—12.	Anemometer. 9 A.M.	CLOUDS. 9 A.M. Species and Direction.	9 A.M. Amount (0—10).	9 P.M. Species and Direction.	9 P.M. Amount (0—10).	SUNSHINE. Hours.	THERMOMETERS under Ground. 9 A.M. No. 3 ins.	No. 12 ins.	No. 22 ins.	No. 36 ins.	No. 48 ins.	GENERAL REMARKS. Occurrence of Snow, Hail, Thunder, Lightning, Fog, Gales, Meteors, Auroras, Remarkable Depression or Elevation of Barometer, etc. *Mention the hour at which Storms, including Thunder and Lightning, began and ended.*	Days of Month.
	inches.	°	inches.	°	°	°	°	°	°	°	°	°	inches.												°	°	°	°	°		
1	29.618	54			57.0	48.0			48.0	47.0			0.00	S.E	2					10										Fair Dull heavy dew	1
2	29.560	57			57.5	43.0			55.8	53.0			0.00	SW	2					Ci	4									fair & fine all day	2
3	29.610	60			61.0	50.0			55.8	54.8			0.02	SW	4					Ci	6									Do Do Do	3
4	29.700	55			60.0	52.1			53.8	52.0			0.02	NW	2					Ci	8									fair Dull	4
5	29.100	58			60.3	45.0			53.4	52.8			0.20	S	6					Ci	10									rain high wind Dull	5
6	29.450	52			56.0	37.2			54.4	51.0			0.04	SW	4						0									fair & clear	6
7	29.450	57			57.0	38.3			54.0	46.0			0.16	S	10					Ci	10									very high wind from 2 Pm	7
8	29.100	58			55.0	42.0			55.0	52.7			0.04	SW	4						8									fair mild Cold air 8 Pm	8
9	30.000	52			53.0	40.6			50.0	48.0			0.00	S	2					Ci	4									fair cold frost dew	9
10	29.810	58			58.0	41.0			56.5	54.8			0.00	S	6					Ci	6									fair Wet 3 Pm	10
11	29.725	57			57.0	46.0			52.4	52.0			0.19	SW	4					Ci	6									heavy dew rain Afternoon	11
12	29.600	56			57.0	42.8			52.2	50.0			0.12	S	4					Ci	3									rain 9 pm. Shower Pm	12
13	29.600	56			53.0	43.0			53.0	44.8			0.26	S	2					Ci	10									heavy rain all night	13
14	29.525	55			55.0	42.0			48.0	45.0			0.22	SW	6					Ci	10									fair breezy heavy shower	14
15	29.250	52			53.5	40.0			47.0	44.0			0.16	SW	4					Ci	4									fair & mild all day	15
16	29.350	51			52.0	44.0			49.0	45.2			0.00	SW	2					Ci	8									Do Do Do	16
17	29.350	56			56.0	47.0			52.0	51.6			0.04	S	2					N	10									Do Do Do	17
18	29.650	55			55.0	47.0			49.8	48.6			0.03	NE	2					Ci	10									Damp dew fair all day	18
19	29.725	55			56.0	41.0			52.0	50.0			0.00	SW	4					Ci	5									high Wind fine afternoon	19
20	29.300	58			59.0	36.0			54.0	49.0			0.02	SW	6					Ci	6									Do Do Do	20
21	29.450	55			59.0	41.0			50.8	47.8			0.01	SW	4					Ci	5									Dull Damp Slight rain Afternoon	21
22	29.700	54			59.0	37.0			49.0	47.0			0.01	S	6					Ci	10									fair rain 7 P.m.	22
23	29.500	54			53.0	37.0			50.1	43.3			0.02	S	6					Ci	5									been heavy rain par gain	23
24	29.100	53			47.0	42.3			45.6	43.6			0.73	NW	8					Ci	6									Do Do Do	24
25	29.725	50			55.0	38.0			42.0	39.5			0.07	W	4					Ci	5									frost on grass fine all day	25
26	29.770	45			42.5	32.4			35.0	34.0			0.00	NW	2					Ci	6									Do Do Do	26
27	29.875	46			42.6	31.0			37.0	35.0			0.00	NW	2						0									fine all day	27
28	29.885	46			43.6	31.0			36.0	35.0			0.02	NW	2					Ci	2									frosty snow showers fine Afternoon	28
29	29.850	46			41.0	31.0			38.0	36.6			0.03	NW	4					Ci	3									hard frost fair showers	29
30	29.800	43			43.1	31.0			35.0	33.6			0.02	NW	2					Ci	2									Do Do gan fine & all day	30
31	30.240	42			43.1	24.6			32.4	30.6			0.00	NW	2					Ci	3									Do fine all day	31
Sums.	1683	14			1511	1137			1561	1409			2.43		120					165											
	1854	93			1072	55			1291	983																					
Means.	59.8	53.0			53.5	40.2			52.3	45.8			✓		5.9					6.0											
Corrections for Instrumental Errors.	-0.10					+1.0																									
Corrections for Diurnal Range.																															
Corrected Means	58.8																														

NOTATION USED IN GENERAL REMARKS.

a.	*denotes* aurora.		
d.	,, drizzling rain.		
f.	,, fog.		
fr.	,, frost.		
h.-fr.	,, hoar-frost.		
h.	,, haze.		
hl.	,, hail.		
l.	,, lightning.		
lu. co.	,, lunar corona.		
lu. ha.	,, lunar halo.		
m.	,, mist.		
p.	,, passing showers.		
r.	,, rain.		
r.²	,, heavy rain.		
sl.	,, sleet.		
sn.	,, snow.		
so. ha.	,, solar halo.		
q.	,, squall.		
q.²	,, violent squalls.		
t.	,, thunder.		
t. s.	,, thunder-storm.		

CLOUDS.

HIGH CLOUDS.

Cirrus,	cir.
Cirro-stratus,	cir.-str.
Cirro-cumulus,	cir.-cum.

MIDDLE CLOUDS.

Strato-cirrus,	str.-cir.
Cumulo-cirrus,	cum.-cir.

LOWER CLOUDS.

Strato-cumulus,	str.-cum.
Cumulus,	cum.
Cumulo-nimbus,	cum.-nim.
Nimbus,	nim.
Stratus,	str.

BEAUFORT SCALE FOR ESTIMATING FORCE OF WIND—(0—12).

FORCE.		FORCE.		FORCE.	
0	Calm.	5	Fresh Breeze.	9	Strong Gale.
1	Light Air.	6	Strong Breeze.	10	Whole Gale.
2	Light Breeze.	7	Moderate Gale.	11	Storm.
3	Gentle Breeze.	8	Fresh Gale.	12	Hurricane.
4	Moderate Breeze.				

BAROMETER. Corrected Mean at 9 A.M., *minus* Correction for Temp. = ____ − 6.5 = .523

Corrected Mean at 9 P.M., *minus* Correction for Temp. = ____ − ____ = ____

Mean at Station, corrected, and at 32°, ... = 29.523

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

Mean, reduced to 32°, and Sea-level, ... = 29.572

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

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

Difference, or **Monthly Range,** ..... = ____

S.-R. THERMOMETER, (in shade) **Highest in Month,** corrected for Index Errors, on the 3 th, ... = 61

Lowest in Month, corrected for Index errors, on the 31 th, ... = 29

Difference, or **Monthly Range,** ..... = 32

Mean of all the Highest, ... = 53.5

Mean of all the Lowest, ... = 41.2

Difference, or **Mean Daily Range,** ..... = 12.3

Mean Temperature of Month, ½ (Mean Max. + Mean Min.), ... = 47.4

S.-R. THERMOMETER, Min. on Grass, Lowest in Month, ... = ____

,, ,, Mean, ... = ____

Black Bulb, Max. in Sun, Highest in Month, ... = ____

HYGROMETER, Dry Bulb, Mean of A.M. and P.M. Readings, ... = 48.5

Wet Bulb, Mean of A.M. and P.M. Readings, ... = 45.8

Computed **Temperature of Dew-Point,** ..... = ____

Do. **Elastic Force of Vapour,** ..... = .277

Do. **Relative Humidity** (Saturation = 100), = 82

RAIN fell on 22 **Days; Amount in Inches,** ..... = 2.43

WIND. SUMMARY.

Direction.	N	NE	E	SE	S	SW	W	NW	Calm or Variable.	Mean Force 0—12.
A.M.		1		1	9	11	1	8		
P.M.										
Sum.	0	2	0	2	18	22	2	16	0	3.9

Observations made and Return verified by Peter Harper

(*Signed*) ____

N.B.—**Rain** to be measured at 9 A.M. and the amount entered to the previous day.

See instructions on back of Schedule.

INSTRUCTIONS FOR TAKING METEOROLOGICAL OBSERVATIONS.

In order to insure uniformity in the observations made at the Observing Stations of the Scottish Meteorological Society, the Council request the Observers to adopt the methods described below.

HOURS OF OBSERVATION.

The Council recommend that Observations be made precisely at 9 A.M. and 9 P.M. (Greenwich Time). At both hours the Barometer and Dry and Wet Bulb Thermometers should be read, and notes made of the Wind, Cloud, and general weather. The Rain Gauge should be read at 9 A.M. only, and the Maximum and Minimum Self-registering Thermometers at 9 P.M. only.

It is hoped that every effort will be made to insure punctuality. When, however, an observation is taken not at the usual hours, it is requested that this be stated in a note on the Schedule.

All instruments used should be compared with a certified standard; Observers are requested to communicate with the Secretary before purchasing new or repairing old instruments.

BAROMETER.

The Barometer should be hung in a good light and in a room not exposed to sudden changes of temperature. The upper part of the scale must not be higher than the level of the observer's eye, and the instrument must hang vertically. Barometers should not be moved from their places except by persons accustomed to the work, as they are very liable to get air into the mercury column when improperly handled. Mercurial barometers mounted in metal cases are the only sort suitable for the accurate measurement of atmospheric pressure.

FORTIN BAROMETER.—In setting this instrument the level of the mercury in the glass cistern has first to be adjusted by turning the screw below the cistern till the surface of the mercury just touches the ivory point which projects downwards from the cover of the cistern. A modification of the Fortin pattern is used at several of the Society's Stations, in which the adjustment is made by turning the screw until the zero line on an ivory rod which projects through the cover of the cistern is brought to coincide with the lines on the uprights beside it. In either pattern this cistern adjustment must be made before the Vernier at the top of the mercury column is set.

In the BOARD OF TRADE pattern of barometer no adjustment of the cistern is required, and the Observer can at once proceed to set the Vernier, which in all three classes of instrument is done as follows:—

First see that the Vernier is raised above the mercury, then lower it till its front and back edge both just touch, that is, form a tangent to, the highest part of the mercury column. The top of the mercury is usually slightly convex, and care must be taken not to bring the Vernier down to where the front of the mercury touches the glass, which is below the real top of the column.

The attached thermometer should be read and noted before setting the barometer, as its readings may be affected by heat from the Observer's body while handling the instrument.

The errors most frequently made in reading the barometer are mistakes of 1·000 inch, 0·100 inch, and 0·050 inch; that is to say, instead of 29·365 one of the following is sometimes set down—viz. 30·365, 29·265, or 29·315. Experience having shown that even the best Observers occasionally make these mistakes, the reading, after it is writen down, should be compared again with the scale.

STEVENSON SCREEN.

The Maximum, Minimum, Dry Bulb, and Wet Bulb Thermometers should be placed in a louvred Stevenson Screen standing over grass and with its door facing north. The Dry and Wet Bulb Thermometers may be conveniently attached to upright laths near the front of the Screen, and the Maximum and Minimum Thermometers to others farther back. The height of the Screen should be such that the bulbs of the Dry and Wet Thermometers are four feet above the ground. The Screen should be painted white inside and out.

MAXIMUM AND MINIMUM THERMOMETERS.

In order that the MAXIMUM THERMOMETER may register the highest temperature of the day, the column of mercury is disconnected from the mercury in the bulb either by an air-bubble in the column (Phillip's pattern), or by the narrowing of the tube near the bulb (Negretti and Zamba's pattern). In either case the instrument is set by holding it vertically, bulb downwards, and gently shaking and tapping it so as to send the portion of the column that remained at the highest point attained back towards the bulb.

The MINIMUM THERMOMETER registers the lowest temperature by an index enclosed in the column of spirit which is drawn towards the bulb as the temperature falls, but remains stationary during any rise of temperature. The lowest reading is therefore the position of the end of the index furthest from the bulb. The instrument is set by inclining it bulb upwards till the index slips down to the end of the column of spirit. Care must be taken not to force any part of the index beyond the end of the spirit. Should this occur, however, or should portions of the spirit get detached and lodge in the upper part of the tube, it is generally possible to set the instrument right again by grasping it near the end furthest from the bulb and giving several rapid vertical swings at arm's length, so as to drive the spirit and index towards the bulb by centrifugal force.

Both Maximum and Minimum should be read and set at 9 P.M. The readings should be written down before the Thermometers are touched; and after setting, both should agree very nearly with the Dry Bulb temperature at that hour. Any difference from the Dry Bulb of more than a degree may be regarded by the Observer as an indication either that the instrument is not properly set, or that it is out of order.

DRY AND WET BULB THERMOMETERS.

The Hygrometer in use at the Society's Stations consists of two thermometers—a Dry and a Wet Bulb—of similar form, and usually mounted on one frame. The bulbs should project at least an inch from the frame, and the Wet Bulb be covered with muslin and connected by strands of cotton with the water cistern. This cistern should be placed an inch or two below the level of the bulbs and at the side of the Wet Bulb furthest from the Dry Bulb; it should not stand directly under the Wet Bulb. Muslins and strands are supplied to most stations from the Society's office, and should be renewed at least once a month. In putting on a fresh muslin care should be taken to touch it as little as may be with the fingers. In frosty weather the strands do not convey water to the muslin, but an accurate observation can generally be insured by soaking the Wet Bulb in water a quarter of an hour before the observation, as from the film of ice thus formed on the muslin evaporation goes on in the same way as from the wet muslin under ordinary circumstances.

RAIN GAUGE.

The Rain Gauge should be read at 9 A.M. each day, and the amount entered to the *previous day on the Schedule*: thus the quantity measured at 9 A.M. on the 5th should be put down on the line containing the observations of the 4th of the month, since out of the twenty-four hours ending at 9 A.M. on 5th, fifteen belong to the 4th and only nine to the 5th, so that the amount may more properly be credited to the former day. The monthly total for, say, January is thus what falls between 9 A.M. on 1st January and 9 A.M. on 1st February.

The measuring glass is divided to hundredths of an inch—the highest line indicating ·50, that is fifty hundredths or half an inch. The amount should be entered on the Schedule thus: if up to say the sixth line in the glass as ·06, if up to the twenty-third line as ·23, if up to the thirtieth line as ·30, and so on, there being always two figures put down to the right of the decimal point. Care should be taken to avoid entering ·08 as simply 8, or ·30 as ·3, as this may cause confusion when adding the figures to get the total for the month.

When the fall exceeds one fill of the measuring glass it is necessary to measure it in portions, and each successive reading should be jotted down on the flyleaf of the note-book or other convenient place before the glass is emptied. Thus after heavy rain the amounts measured might be:—

·47
·42
·38
1·27

The total, 1·27, would be entered on the Schedule.

The glass must be held vertically or placed on a level surface when reading. A little uncertainty is sometimes caused by the upward curvature of the water where it touches the side of the glass, but the true reading is half way between the two apparent edges of the water surface. When there is nothing in the gauge a stroke (——) should be entered on the Schedule rather than the figure 0.

Snow or **Hail** is counted as Rainfall, and should be melted and measured as such. The upper part of the gauge may be taken indoors, and what is lying in it thawed. To save time, especially if snow or rain be then falling, it is convenient to add a measured quantity of warm water to the snow in the gauge, this quantity being afterwards deducted from the total to get the amount that has fallen. The depth of snow lying on the ground should be noted in the Remarks column.

In gauges, such as Flemings, in which a float and measuring rod is used, the rod should be removed or tied down below the level of the rim, except when a measurement is being taken, because if allowed to project above the gauge, it would prevent it catching the true amount of fall.

If a gauge is only read once a month this should be done on the morning of the 1st, and the amount entered to the previous month.

The Rain Gauge should be placed in an open situation, if possible with no elevated objects close to it, in any case trees, walls, etc., should never be nearer to the gauge in horizontal distance than their own height. The gauge should be firmly fixed with its rim 12 inches above ground; if surrounded by grass, care must be taken that it is never allowed to grow as high as the rim. The gauges at most Stations are five inches in diameter, though a few of larger or smaller size are also in use. A convenient way of fixing a gauge in position is to drive four stout wooden pegs from 12 to 18 inches long into the ground, one at each side of the gauge.

WIND, CLOUD, SUNSHINE, ETC.

WIND.

The direction and force of the Wind should be noted at 9 A.M. and 9 P.M. In confined situations where the true direction cannot be easily observed, it is best to ascertain this by watching the movement of smoke from chimneys, or even of the lower clouds. The force of the wind should be noted according to the scale given on the other side of the Schedule.

At Stations where an Anemometer is in use, the readings at 9 A.M. each day should be put down in the column provided, the values being entered to the previous day, as in the case of the Rainfall.

CLOUDS.

The amount of Cloud should be estimated on the scale, 0 to 10, 0 indicating a clear and 10 an overcast sky. Only the part of the sky over 30° above the horizon should be taken into account, as it is impossible to estimate the space covered by Clouds nearer the horizon. A convenient table for noting briefly the species of Cloud will be found on the other side of the Schedule. It is desirable to note, if possible, the direction from which the Clouds are moving. If there is more than one layer of clouds on the sky, they should be noted.

Thus, for example,

Cir. W.	4
Cum. Str. S.W.	2

would indicate that four-tenths of the sky was covered with cirrus moving from the West, and two-tenths with cumulus moving from the S.W.

SUNSHINE.

This column is primarily for those Stations where a Sunshine Recorder is kept; at other Stations, however, the Observer may note in it the number of hours each day that the sun shines with sufficient clearness to cast a distinct shadow.

RADIATION THERMOMETERS.

A MAXIMUM THERMOMETER, with its bulb blackened and enclosed in an outer glass bulb exhausted of air, is used at many stations to register the highest temperature in the sun. It should be mounted horizontally about four feet above ground with its bulb pointing south, and should be read and set at 9 P.M.

A MINIMUM THERMOMETER on grass is used to register the lowest radiation temperature at night. It should be placed on wooden supports a few inches above the surface of the grass. It may be read and set at 9 P.M., but in warm weather, as the spirit in this instrument is liable to evaporate when exposed to bright sunshine and to condense again in the upper part of the tube, it is better to read it at 9 A.M., to put it inside the screen during the day, and to set and replace it at 9 P.M.

THERMOMETERS UNDER GROUND.

These should be read at 9 A.M., and the readings entered on the day on which they are made.

REMARKS.

In the Remarks column should be noted all occurrences of Snow, Hail, or Heavy Rain; of Thunder, or Lightning, or both together; of all Auroras, Meteors, or Halos round the sun or moon; Fogs, Gales or Storms, and generally of all noteworthy Weather phenomena.

The table and additional lines on the back of the Schedule are for the use of those Observers who wish to record Notes connected with the changes of the Seasons, such as the growth of Crops, Fruit, etc., and the migrations of Birds; also the prevalence of Diseases in man, in the lower animals, and in plants. Such observations are often of great interest and utility when taken in conjunction with the ordinary Meteorological records.

DATES IN CONNECTION WITH THE PERIODICAL RETURN OF THE SEASONS.

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

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

The Society will be glad to receive any portions of the information indicated in this table that may come under the Observer's notice.

ADDITIONAL REMARKS.

BOOK POST.

THE SECRETARY,
Scottish Meteorological Society,
122 *George Street,*
EDINBURGH.

SCOTTISH METEOROLOGICAL SOCIETY.

Observations taken at Duthie Park, County of Aberdeen, During the MONTH of ~~October~~ November 1909.

Lat. 57.9, Long. 2.6, Distance from Sea 2 miles. Height of Cistern of the Barometer above Mean Sea-Level ____ feet, above Ground ____ feet.

Diameter of Rain Gauge 5 inches. Height of Rim of Gauge above Ground 10 inches

The Hours of Observation are of Greenwich Time.

Days of Month.	BAROMETER. 9 A.M. Barometer. No.	9 A.M. Attached Thermometer	9 P.M. Barometer. No.	9 P.M. Attached Thermometer	SELF-REGISTERING THERMOMETERS, Read Daily, at 9 P.M. Protected in Screen, 4 feet above Ground. Max. No.	Min. No.	Black Bulb Max. in Sun. No.	Min. on Grass. No.	HYGROMETER. Dry No. ____ Wet No. ____ 9 A.M. Dry bulb.	9 A.M. Wet bulb.	9 P.M. Dry bulb.	9 P.M. Wet bulb.	RAIN. Amount at 9 A.M.	WIND. 9 A.M. Direction.	9 A.M. Force. Scale of 0—12.	9 P.M. Direction.	9 P.M. Force. Scale of 0—12.	Anemometer. 9 A.M.	CLOUDS. 9 A.M. Species and Direction.	9 A.M. Amount (0—10).	9 P.M. Species and Direction.	9 P.M. Amount (0—10).	SUNSHINE. Hours.	THERMOMETERS under Ground. 9 A.M. No. 3 ins.	No. 12 ins.	No. 22 ins.	No. 36 ins.	No. 48 ins.	GENERAL REMARKS. Occurrence of Snow, Hail, Thunder, Lightning, Fog, Gales, Meteors, Auroras, Remarkable Depression or Elevation of Barometer, etc. *Mention the hour at which Storms, including Thunder and Lightning, began and ended.*	Days of Month.
	inches.	°	inches.	°	°	°	°	°	°	°	°	°	inches.												°	°	°	°	°	~~dull most of day rain Pm~~	
1	30.200	43			43.0	23.2							0.00	S	2	N	2	N	10											dull most of the day rain Pm	1
2	29.850	48		54	54.3	35.8							0.33	SW	1	SW	1	N	10											been heavy rain, fair afternoon	2
3	30.100	51		59	57.8	44.0							0.05	N	10	SW	1	N	10											Dull fair mild & very fine	3
4	30.075	50			58.0	41.0							0.00	SW	1			N	10											Dull fair Do Do	4
5	29.925	52			57.9	40.2							0.05	SW	1			Ci	8											Fair very mild Do	5
6	29.900	47		51	48.0	36.2							0.01	SW	1															Ps Ps	6
7	30.200	49		43	45.0	34.2							0.00	NW	2			Ci	3											White frost fair but slight rain p.m.	7
8	30.215	46			43.0	26.0							0.03	SW	2			Ci	3											Fog clear fine all day	8
9	29.710	49			51.0	29.5							0.00	SW	4			Cu	8											Fair dull some rain	9
10	29.775	48		44	48.1	37.7							0.11	NW	3			Ci	3											Fair heavy rain cool p.m.	10
11	30.050	47		53	50.0	35.2							0.04	NW	2			R	10											Fair. dull all day	11
12	29.500	51			53.0	38.4							0.37	NW	6			R	10											Heavy rain frequent all day	12
13	29.550	45			44.0	34.0							0.14	NW	4			Cu	6	g.	*									Very stormy night, snowstorms	13
14	29.760	40			33.0	30.3							0.02	NW	2			Cu	6		*									Snow came on 7 A.M.	14
15	29.900	40			40.3	21.5							0.25	W	2				0		*									Fair, snow lying, hard frost	15
16	30.200	37			39.0	17.0							0.00	W	2				0											Very hard frost, clear & fair	16
17	30.300	32			23.0	13.0							0.00	SW	2															Do Do	17
18	30.250	32			28.0	13.9							0.00	SW	2			Ci	2											Do Do	18
19	30.200	34			42.0	24.0							0.00	SW	2				0											Fresh fair & fine	19
20	30.145	40			44.0	36.4							0.00	SW	2			Ci	5											Fair & fine	20
21	29.955	43			44.0	38.2							0.15	N	2			Ci	4		Sl.									Sleet showers	21
22	30.150	43			42.0	34.0							0.03	NE	2			Ci	6		Sl.									Do Do	22
23	30.285	43			38.0	33.0							0.04	W	2			Ci	4											Fair & fine all day.	23
24	30.285	45			43.0	38.5							0.00	NW	2			Ci	6											Do Do	24
25	30.145	45			47.0	36.2							0.01	NW	2			Ci	5											Do Do	25
26	29.945	43			45.0	28.0							1.00	W	1															Fair, White frost & fine all day.	26
27	29.680	45			46.0	31.0							0.00	SW	4			Ci	10											Fair & fresh windy, rain p.m.	27
28	29.530	44			44.2	28.0							1.20	SW	2			R	10											Dull, been heavy rain	28
29	29.107	46			48.0	37.0							0.17	SW	2				0											Fair and fine all day	29
30	28.775	48			42.5	36.0							0.00	SW	2			Ci	6											Fair & fine.	30
31																															31
Sums.	1395	1.2			1333	1135							5 1.90		15				155												
	27.791	120			1343	38.1																									
Means.	29.916	44.0			44.5	31.3							✓		2.2				5.2												
Corrections for Instrumental Errors.	-010					+1.0																									
Corrections for Diurnal Range.																															
Corrected Means	906																														

S 5 0 0 7 8 0 1

NOTATION USED IN GENERAL REMARKS.

a. *denotes* aurora.
d. ,, drizzling rain.
f. ,, fog.
fr. ,, frost.
h.-fr. ,, hoar-frost.
h. ,, haze.
hl. ,, hail.
l. ,, lightning.
lu. co. ,, lunar corona.
lu. ha. ,, lunar halo.
m. ,, mist.
p. ,, passing showers.
r. ,, rain.
r.² ,, heavy rain.
sl. ,, sleet.
sn. ,, snow.
so. ha. ,, solar halo.
q. ,, squall.
q.² ,, violent squalls.
t. ,, thunder.
t. s. ,, thunder-storm.

CLOUDS.

HIGH CLOUDS.

Cirrus, ... cir.
Cirro-stratus, . . cir.-str.
Cirro-cumulus, . . cir.-cum.

MIDDLE CLOUDS.

Strato-cirrus, . . str.-cir.
Cumulo-cirrus, . . cum.-cir.

LOWER CLOUDS.

Strato-cumulus, . . . str.-cum.
Cumulus, ... cum.
Cumulo-nimbus, . . . cum.-nim.
Nimbus, ... nim.
Stratus, ... str.

BEAUFORT SCALE FOR ESTIMATING FORCE OF WIND—(0—12).

FORCE.		FORCE.		FORCE.	
0	Calm.	5	Fresh Breeze.	9	Strong Gale.
1	Light Air.	6	Strong Breeze.	10	Whole Gale.
2	Light Breeze.	7	Moderate Gale.	11	Storm.
3	Gentle Breeze.	8	Fresh Gale.	12	Hurricane.
4	Moderate Breeze.				

BAROMETER. Corrected Mean at 9 A.M., *minus* Correction for Temp. = ...—42... = .864

Corrected Mean at 9 P.M., *minus* Correction for Temp. = ...—.... = ____

Mean at Station, corrected, and at 32°, ... = 29.864

Correction for height, feet above Mean Sea-level, ... = + 50

Mean, reduced to 32°, and Sea-level, ... = 29.914

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

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

Difference, or **Monthly Range,** ..... = ____

S.-R. THERMOMETER, (in shade) **Highest in Month,** corrected for Index Errors, on the 3 th, ~~4~~ ..... = 58

Lowest in Month, corrected for Index errors, on the 17 th, ... = 13.0

Difference, or **Monthly Range,** ..... = 45

Mean of all the Highest, ... = 44.5

Mean of all the Lowest, ... = 32.3

Difference, or **Mean Daily Range,** ..... = 12.2

Mean Temperature of Month, ½ (Mean Max. + Mean Min.), ... = 38.4

S.-R. THERMOMETER, Min. on Grass, Lowest in Month, ... = ____

,, ,, Mean, ... = ____

Black Bulb, Max. in Sun, Highest in Month, ... = ____

HYGROMETER, Dry Bulb, Mean of A.M. and P.M. Readings, ... = ____

Wet Bulb, Mean of A.M. and P.M. Readings, ... = ____

Computed **Temperature of Dew-Point,** ..... = ____

Do. **Elastic Force of Vapour,** ..... = ____

Do. **Relative Humidity** (Saturation = 100), = ____

RAIN fell on 16 **Days; Amount in Inches,** ..... = 1.90

WIND. SUMMARY. Direction.	N	NE	E	SE	S	SW	W	NW	Calm or Variable.	Mean Force 0—12.
A.M.	2	1			1	13	5	8		
P.M.										
Sum.	4	2	0	0	2	26	10	16	0	2.2

Observations made and Return verified by Peter Harper

(*Signed*) ____

N.B.—**Rain** to be measured at 9 A.M. and the amount entered to the previous day.
See instructions on back of Schedule.

INSTRUCTIONS FOR TAKING METEOROLOGICAL OBSERVATIONS.

In order to insure uniformity in the observations made at the Observing Stations of the Scottish Meteorological Society, the Council request the Observers to adopt the methods described below.

HOURS OF OBSERVATION.

The Council recommend that Observations be made precisely at 9 A.M. and 9 P.M. (Greenwich Time). At both hours the Barometer and Dry and Wet Bulb Thermometers should be read, and notes made of the Wind, Cloud, and general weather. The Rain Gauge should be read at 9 A.M. only, and the Maximum and Minimum Self-registering Thermometers at 9 P.M. only.

It is hoped that every effort will be made to insure punctuality. When, however, an observation is taken not at the usual hours, it is requested that this be stated in a note on the Schedule.

All instruments used should be compared with a certified standard; Observers are requested to communicate with the Secretary before purchasing new or repairing old instruments.

BAROMETER.

The Barometer should be hung in a good light and in a room not exposed to sudden changes of temperature. The upper part of the scale must not be higher than the level of the observer's eye, and the instrument must hang vertically. Barometers should not be moved from their places except by persons accustomed to the work, as they are very liable to get air into the mercury column when improperly handled. Mercurial barometers mounted in metal cases are the only sort suitable for the accurate measurement of atmospheric pressure.

FORTIN BAROMETER.—In setting this instrument the level of the mercury in the glass cistern has first to be adjusted by turning the screw below the cistern till the surface of the mercury just touches the ivory point which projects downwards from the cover of the cistern. A modification of the Fortin pattern is used at several of the Society's Stations, in which the adjustment is made by turning the screw until the zero line on an ivory rod which projects through the cover of the cistern is brought to coincide with the lines on the uprights beside it. In either pattern this cistern adjustment must be made before the Vernier at the top of the mercury column is set.

In the BOARD OF TRADE pattern of barometer no adjustment of the cistern is required, and the Observer can at once proceed to set the Vernier, which in all three classes of instrument is done as follows:—

First see that the Vernier is raised above the mercury, then lower it till its front and back edge both just touch, that is, form a tangent to, the highest part of the mercury column. The top of the mercury is usually slightly convex, and care must be taken not to bring the Vernier down to where the front of the mercury touches the glass, which is below the real top of the column.

The attached thermometer should be read and noted before setting the barometer, as its readings may be affected by heat from the Observer's body while handling the instrument.

The errors most frequently made in reading the barometer are mistakes of 1·000 inch, 0·100 inch, and 0·050 inch; that is to say, instead of 29·365 one of the following is sometimes set down—viz. 30·365, 29·265, or 29·315. Experience having shown that even the best Observers occasionally make these mistakes, the reading, after it is writen down, should be compared again with the scale.

STEVENSON SCREEN.

The Maximum, Minimum, Dry Bulb, and Wet Bulb Thermometers should be placed in a louvred Stevenson Screen standing over grass and with its door facing north. The Dry and Wet Bulb Thermometers may be conveniently attached to upright laths near the front of the Screen, and the Maximum and Minimum Thermometers to others farther back. The height of the Screen should be such that the bulbs of the Dry and Wet Thermometers are four feet above the ground. The Screen should be painted white inside and out.

MAXIMUM AND MINIMUM THERMOMETERS.

In order that the MAXIMUM THERMOMETER may register the highest temperature of the day, the column of mercury is disconnected from the mercury in the bulb either by an air-bubble in the column (Phillip's pattern), or by the narrowing of the tube near the bulb (Negretti and Zambra's pattern). In either case the instrument is set by holding it vertically, bulb downwards, and gently shaking and tapping it so as to send the portion of the column that remained at the highest point attained back towards the bulb.

The MINIMUM THERMOMETER registers the lowest temperature by an index enclosed in the column of spirit which is drawn towards the bulb as the temperature falls, but remains stationary during any rise of temperature. The lowest reading is therefore the position of the end of the index furthest from the bulb. The instrument is set by inclining it bulb upwards till the index slips down to the end of the column of spirit. Care must be taken not to force any part of the index beyond the end of the spirit. Should this occur, however, or should portions of the spirit get detached and lodge in the upper part of the tube, it is generally possible to set the instrument right again by grasping it near the end furthest from the bulb and giving several rapid vertical swings at arm's length, so as to drive the spirit and index towards the bulb by centrifugal force.

Both Maximum and Minimum should be read and set at 9 P.M. The readings should be written down before the Thermometers are touched; and after setting, both should agree very nearly with the Dry Bulb temperature at that hour. Any difference from the Dry Bulb of more than a degree may be regarded by the Observer as an indication either that the instrument is not properly set, or that it is out of order.

DRY AND WET BULB THERMOMETERS.

The Hygrometer in use at the Society's Stations consists of two thermometers—a Dry and a Wet Bulb—of similar form, and usually mounted on one frame. The bulbs should project at least an inch from the frame, and the Wet Bulb be covered with muslin and connected by strands of cotton with the water cistern. This cistern should be placed an inch or two below the level of the bulbs and at the side of the Wet Bulb furthest from the Dry Bulb; it should not stand directly under the Wet Bulb. Muslins and strands are supplied to most stations from the Society's office, and should be renewed at least once a month. In putting on a fresh muslin care should be taken to touch it as little as may be with the fingers. In frosty weather the strands do not convey water to the muslin, but an accurate observation can generally be insured by soaking the Wet Bulb in water a quarter-of an hour before the observation, as from the film of ice thus formed on the muslin evaporation goes on in the same way as from the wet muslin under ordinary circumstances.

RAIN GAUGE.

The Rain Gauge should be read at 9 A.M. each day, and the amount entered to the *previous day on the Schedule*: thus the quantity measured at 9 A.M. on the 5th should be put down on the line containing the observations of the 4th of the month, since out of the twenty-four hours ending at 9 A.M. on 5th, fifteen belong to the 4th and only nine to the 5th, so that the amount may more properly be credited to the former day. The monthly total for, say, January is thus what falls between 9 A.M. on 1st January and 9 A.M. on 1st February.

The measuring glass is divided to hundredths of an inch—the highest line indicating ·50, that is fifty hundredths or half an inch. The amount should be entered on the Schedule thus: if up to say the sixth line in the glass as ·06, if up to the twenty-third line as ·23, if up to the thirtieth line as ·30, and so on, there being always two figures put down to the right of the decimal point. Care should be taken to avoid entering ·08 as simply 8, or ·30 as ·3, as this may cause confusion when adding the figures to get the total for the month.

When the fall exceeds one fill of the measuring glass it is necessary to measure it in portions, and each successive reading should be jotted down on the flyleaf of the note-book or other convenient place before the glass is emptied. Thus after heavy rain the amounts measured might be:—

·47
·42
·38
1·27

The total, 1·27, would be entered on the Schedule.

The glass must be held vertically or placed on a level surface when reading. A little uncertainty is sometimes caused by the upward curvature of the water where it touches the side of the glass, but the true reading is half way between the two apparent edges of the water surface. When there is nothing in the gauge a stroke (——) should be entered on the Schedule rather than the figure 0.

Snow or **Hail** is counted as Rainfall, and should be melted and measured as such. The upper part of the gauge may be taken indoors, and what is lying in it thawed. To save time, especially if snow or rain be then falling, it is convenient to add a measured quantity of warm water to the snow in the gauge, this quantity being afterwards deducted from the total to get the amount that has fallen. The depth of snow lying on the ground should be noted in the Remarks column.

In gauges, such as Flemings, in which a float and measuring rod is used, the rod should be removed or tied down below the level of the rim, except when a measurement is being taken, because if allowed to project above the gauge, it would prevent it catching the true amount of fall.

If a gauge is only read once a month this should be done on the morning of the 1st, and the amount entered to the previous month.

The Rain Gauge should be placed in an open situation, if possible with no elevated objects close to it, in any case trees, walls, etc., should never be nearer to the gauge in horizontal distance than their own height. The gauge should be firmly fixed with its rim 12 inches above ground; if surrounded by grass, care must be taken that it is never allowed to grow as high as the rim. The gauges at most Stations are five inches in diameter, though a few of larger or smaller size are also in use. A convenient way of fixing a gauge in position is to drive four stout wooden pegs from 12 to 18 inches long into the ground, one at each side of the gauge.

WIND, CLOUD, SUNSHINE, ETC.

WIND.

The direction and force of the Wind should be noted at 9 A.M. and 9 P.M. In confined situations where the true direction cannot be easily observed, it is best to ascertain this by watching the movement of smoke from chimneys, or even of the lower clouds. The force of the wind should be noted according to the scale given on the other side of the Schedule.

At Stations where an Anemometer is in use, the readings at 9 A.M. each day should be put down in the column provided, the values being entered to the previous day, as in the case of the Rainfall.

CLOUDS.

The amount of Cloud should be estimated on the scale, 0 to 10, 0 indicating a clear and 10 an overcast sky. Only the part of the sky over 30° above the horizon should be taken into account, as it is impossible to estimate the space covered by Clouds nearer the horizon. A convenient table for noting briefly the species of Cloud will be found on the other side of the Schedule. It is desirable to note, if possible, the direction from which the Clouds are moving. If there is more than one layer of clouds on the sky, they should be noted.

Thus, for example,

Cir. W. . .	4
Cum. Str. S.W.	2

would indicate that four-tenths of the sky was covered with cirrus moving from the West, and two-tenths with cumulus moving from the S.W.

SUNSHINE.

This column is primarily for those Stations where a Sunshine Recorder is kept; at other Stations, however, the Observer may note in it the number of hours each day that the sun shines with sufficient clearness to cast a distinct shadow.

RADIATION THERMOMETERS.

A MAXIMUM THERMOMETER, with its bulb blackened and enclosed in an outer glass bulb exhausted of air, is used at many stations to register the highest temperature in the sun. It should be mounted horizontally about four feet above ground with its bulb pointing south, and should be read and set at 9 P.M.

A MINIMUM THERMOMETER on grass is used to register the lowest radiation temperature at night. It should be placed on wooden supports a few inches above the surface of the grass. It may be read and set at 9 P.M., but in warm weather, as the spirit in this instrument is liable to evaporate when exposed to bright sunshine and to condense again in the upper part of the tube, it is better to read it at 9 A.M., to put it inside the screen during the day, and to set and replace it at 9 P.M.

THERMOMETERS UNDER GROUND.

These should be read at 9 A.M., and the readings entered on the day on which they are made.

REMARKS.

In the Remarks column should be noted all occurrences of Snow, Hail, or Heavy Rain; of Thunder, or Lightning, or both together; of all Auroras, Meteors, or Halos round the sun or moon; Fogs, Gales or Storms, and generally of all noteworthy Weather phenomena.

The table and additional lines on the back of the Schedule are for the use of those Observers who wish to record Notes connected with the changes of the Seasons, such as the growth of Crops, Fruit, etc., and the migrations of Birds; also the prevalence of Diseases in man, in the lower animals, and in plants. Such observations are often of great interest and utility when taken in conjunction with the ordinary Meteorological records.

DATES IN CONNECTION WITH THE PERIODICAL RETURN OF THE SEASONS.

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

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

The Society will be glad to receive any portions of the information indicated in this table that may come under the Observer's notice.

ADDITIONAL REMARKS.

BOOK POST.

THE SECRETARY,
Scottish Meteorological Society,
122 *George Street,*
EDINBURGH.

SCOTTISH METEOROLOGICAL SOCIETY.

Observations taken at Duthie Park Aberdeen County of Aberdeen, During the MONTH of December 1909.

Lat. ____, Long. ____, Distance from Sea 2 miles. Height of Cistern of the Barometer above Mean Sea-Level 44, feet, above Ground 4 feet.

Diameter of Rain Gauge 5" inches. Height of Rim of Gauge above Ground 12 inches

The Hours of Observation are of Greenwich Time.

Days of Month.	BAROMETER. 9 A.M. Barometer. No.	9 A.M. Attached Thermometer	9 P.M. Barometer, No.	9 P.M. Attached Thermometer	SELF-REGISTERING THERMOMETERS, Read Daily, at 9 P.M. Protected in Screen, 4 feet above Ground. Max.	Min.	Black Bulb Max. in Sun.	Min. on Grass.	HYGROMETER. Dry No. ____ Wet No. ____ 9 A.M. Dry bulb.	9 A.M. Wet bulb.	9 P.M. Dry bulb.	9 P.M. Wet bulb.	RAIN. Amount at 9 A.M.	WIND. 9 A.M. Direction.	9 A.M. Force. Scale of 0—12.	9 P.M. Direction.	9 P.M. Force. Scale of 0—12.	Anemometer. 9 A.M.	CLOUDS. 9 A.M. Species and Direction.	9 A.M. Amount (0—10).	9 P.M. Species and Direction.	9 P.M. Amount (0—10).	SUNSHINE. Hours.	THERMOMETERS under Ground. 9 A.M. No. 3 ins.	No. 12 ins.	No. 22 ins.	No. 36 ins.	No. 48 ins.	GENERAL REMARKS. Occurrence of Snow, Hail, Thunder, Lightning, Fog, Gales, Meteors, Auroras, Remarkable Depression or Elevation of Barometer, etc. *Mention the hour at which Storms, including Thunder and Lightning, began and ended.*	Days of Month.
	inches.	°	inches.	°	°	°	°	°	°	°	°	°	inches.												°	°	°	°	°		
1	29.100	44			42.4	29.0			30.0	29.0			0.00	SW	2				5 Ac											Fair & fine white frost	1
2	28.975	40			42.0	27.0			28.0	27.0			0.00	W.	3				3 Ci											Fair hard frost all day	2
3	28.275	42			42.2	27.0			33.0	32.5			0.40	W.	6				10 N											been heavy rain	3
4	28.700	40			38.3	32.0			33.0	32.0			0.45	W	6				2 Ci											hard frost all day & night	4
5	28.900	40			38.2	23.0			32.0	31.3			0.00	W	2				0											fair hard frost	5
6	29.005	25			38.2	27.0			32.0	31.4			0.00	W	2				0											Do Do Do	6
7	29.300	25			28.1	20.0			27.1	26.0			0.00	SW	2				0											Do Do Do	7
8	29.760	39			35.0	20.0			30.0	29.0			0.00	W	2				2 Ci											Do Do Do	8
9	29.955	40			38.0	26.0			38.0	35.8			0.00	S	4				10 Ci											Do Do Do	9
10	29.550	44			50.5	37.0			49.5	48.2			0.24	SW	2				10 N											fair hard frost rain evening	10
11	29.875	39			33.0	37.1			43.8	43.4			0.27	NE	2				10 M											rain all day	11
12	30.125	39			46.0	41.4			45.2	45.0			1.70	WE	2				10 N											Dull	12
13	30.480	40			46.0	41.0			43.0	42.6			0.02	SE	2				10 M											Dull fair	13
14	30.550	48			43.0	41.0			42.0	41.0			0.00	S	2				10 M											Do Do	14
15	30.650	44			44.0	35.4			38.4	35.2			0.00	SW	2				10 M											Do Do	15
16	30.350	44			44.0	35.5			38.5	35.0			0.00	SW	2				8 Ci											fair & fine	16
17	29.850	46			44.0	31.0			31.0	30.0			0.00	SW	2				8 Ci											fair & very fine mild	17
18	29.375	44			36.0	30.0			30.0	29.0			0.18	NW	4				10 M											snow showers	18
19	29.250	38			34.0	21.0			29.0	28.0			0.04	W	4				2 Ci											fair been snow showers	19
20	29.150	38			36.0	24.0			29.8	29.4			0.02	W	2				8 Ci											fair. Do	20
21	29.625	37			36.0	21.0			24.0	22.0			0.02	SW	2				0											Do. Do	21
22	29.245	40			33.0	31.0			23.0	21.0			0.07	SW	2				5											fresh heavy rain	22
23	29.250	40			43.0	31.0			43.0	41.5			0.60	SW	2				6 Ci											fresh & fine	23
24	29.575	41			42.3	26.6			29.0	28.3			0.00	SW	2				0											frost & fair	24
25	29.550	42			36.6	28.0			34.8	34.0			0.00	SW	2				10 M											soft like rain high wind	25
26	29.201	43			38.8	28.5			38.5	37.6			0.19	SW	6				5 Ci											been rain fair breezy	26
27	29.650	44			43.8	32.0			34.0	33.0			0.00	W	2				0											fair frosty	27
28	29.035	45			41.0	31.0			33.4	32.0			0.40	NW	2				0											fair Do	28
29	30.100	44			40.0	29.1			36.0	34.0			0.00	NW	2				6 Ci											fair & fine	29
30	30.250	42			43.1	27.6			36.0	33.5			0.00	NW	2				6 Ci											Do Do	30
31	30.250	42			47.2	35.4			32.4	30.6			0.00	SW	2				3 Ci											Do Do	31
Sums.	29.135	11			154	114			135	136			4.62		82				169													
	17.905	19			307	296.2			125.7	90.6																						
Means.	29.578	406			41.0	29.6			34.1	32.9					2.6				5.5													
Corrections for Instrumental Errors.						+1.0																										
Corrections for Diurnal Range.	?																															
Corrected Means																																

NOTATION USED IN GENERAL REMARKS.

a. denotes aurora. d. ,, drizzling rain. f. ,, fog. fr. ,, frost. h.-fr. ,, hoar-frost. h. ,, haze. hl. ,, hail. l. ,, lightning. lu. co. ,, lunar corona. lu. ha. ,, lunar halo. m. ,, mist. p. ,, passing showers. r. ,, rain. r.² ,, heavy rain. sl. ,, sleet. sn. ,, snow. so. ha. ,, solar halo. q. ,, squall. q.² ,, violent squalls. t. ,, thunder. t. s. ,, thunder-storm.

CLOUDS.

HIGH CLOUDS.
Cirrus, ... cir.
Cirro-stratus, . . . cir.-str.
Cirro-cumulus, . . . cir.-cum.

MIDDLE CLOUDS.
Strato-cirrus, . . str.-cir.
Cumulo-cirrus, . . cum.-cir.

LOWER CLOUDS.
Strato-cumulus, . . . str.-cum.
Cumulus, ... cum.
Cumulo-nimbus, . . . cum.-nim.
Nimbus, ... nim.
Stratus, ... str.

BEAUFORT SCALE FOR ESTIMATING FORCE OF WIND—(0—12).

FORCE.		FORCE.		FORCE.	
0	Calm.	5	Fresh Breeze.	9	Strong Gale.
1	Light Air.	6	Strong Breeze.	10	Whole Gale.
2	Light Breeze.	7	Moderate Gale.	11	Storm.
3	Gentle Breeze.	8	Fresh Gale.	12	Hurricane.
4	Moderate Breeze.				

BAROMETER. Corrected Mean at 9 A.M., *minus* Correction for Temp. = ...32.... = 29.546

Corrected Mean at 9 P.M., *minus* Correction for Temp. = ... = 29.546

Mean at Station, corrected, and at 32°, ... = 29.546 .48

Correction for height, feet above Mean Sea-level, ... = + .050 .50

Mean, reduced to 32°, and Sea-level, ... = 29.596 .536

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

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

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

S.-R. THERMOMETER, (in shade) **Highest in Month,** corrected for Index Errors, on the 10 th, ... = 53.-

Lowest in Month, corrected for Index errors, on the 7 th, 18 .... = 20.-

Difference, or **Monthly Range,** .... = 33.-

Mean of all the Highest, ... = 41.0

Mean of all the Lowest, ... = 30.6

Difference, or **Mean Daily Range,** .... = 10.4

Mean Temperature of Month, ½ (Mean Max. + Mean Min.), ... = 35.8

S.-R. THERMOMETER, Min. on Grass, Lowest in Month, ... =

,, ,, Mean, ... =

Black Bulb, Max. in Sun, Highest in Month, ... =

HYGROMETER, Dry Bulb, Mean of A.M. and P.M. Readings, ... = 34.1

Wet Bulb, Mean of A.M. and P.M. Readings, ... = 32.9

Computed **Temperature of Dew-Point,** .... =

Do. **Elastic Force of Vapour,** .... = .173

Do. **Relative Humidity** (Saturation = 100), = 87

RAIN fell on 15 **Days; Amount in Inches,** .... = 4.62

WIND. SUMMARY.

Direction.	N	NE	E	SE	S	SW	W	NW	Calm or Variable.	Mean Force 0—12.
A.M.	0	2	0	1	2	13	9	4	—	
P.M.										
Sum.	0	4	0	2	4	26	18	8	0	2.6

= 62

Observations made and Return verified by Peter Harper

(Signed) ____

N.B.—**Rain** to be measured at 9 A.M. and the amount entered to the previous day.

See instructions on back of Schedule.

INSTRUCTIONS FOR TAKING METEOROLOGICAL OBSERVATIONS.

In order to insure uniformity in the observations made at the Observing Stations of the Scottish Meteorological Society, the Council request the Observers to adopt the methods described below.

HOURS OF OBSERVATION.

The Council recommend that Observations be made precisely at 9 A.M. and 9 P.M. (Greenwich Time). At both hours the Barometer and Dry and Wet Bulb Thermometers should be read, and notes made of the Wind, Cloud, and general weather. The Rain Gauge should be read at 9 A.M. only, and the Maximum and Minimum Self-registering Thermometers at 9 P.M. only.

It is hoped that every effort will be made to insure punctuality. When, however, an observation is taken not at the usual hours, it is requested that this be stated in a note on the Schedule.

All instruments used should be compared with a certified standard; Observers are requested to communicate with the Secretary before purchasing new or repairing old instruments.

BAROMETER.

The Barometer should be hung in a good light and in a room not exposed to sudden changes of temperature. The upper part of the scale must not be higher than the level of the observer's eye, and the instrument must hang vertically. Barometers should not be moved from their places except by persons accustomed to the work, as they are very liable to get air into the mercury column when improperly handled. Mercurial barometers mounted in metal cases are the only sort suitable for the accurate measurement of atmospheric pressure.

FORTIN BAROMETER.—In setting this instrument the level of the mercury in the glass cistern has first to be adjusted by turning the screw below the cistern till the surface of the mercury just touches the ivory point which projects downwards from the cover of the cistern. A modification of the Fortin pattern is used at several of the Society's Stations, in which the adjustment is made by turning the screw until the zero line on an ivory rod which projects through the cover of the cistern is brought to coincide with the lines on the uprights beside it. In either pattern this cistern adjustment must be made before the Vernier at the top of the mercury column is set.

In the BOARD OF TRADE pattern of barometer no adjustment of the cistern is required, and the Observer can at once proceed to set the Vernier, which in all three classes of instrument is done as follows:—

First see that the Vernier is raised above the mercury, then lower it till its front and back edge both just touch, that is, form a tangent to, the highest part of the mercury column. The top of the mercury is usually slightly convex, and care must be taken not to bring the Vernier down to where the front of the mercury touches the glass, which is below the real top of the column.

The attached thermometer should be read and noted before setting the barometer, as its readings may be affected by heat from the Observer's body while handling the instrument.

The errors most frequently made in reading the barometer are mistakes of 1·000 inch, 0·100 inch, and 0·050 inch; that is to say, instead of 29·365 one of the following is sometimes set down—viz. 30·365, 29·265, or 29·315. Experience having shown that even the best Observers occasionally make these mistakes, the reading, after it is writen down, should be compared again with the scale.

STEVENSON SCREEN.

The Maximum, Minimum, Dry Bulb, and Wet Bulb Thermometers should be placed in a louvred Stevenson Screen standing over grass and with its door facing north. The Dry and Wet Bulb Thermometers may be conveniently attached to upright laths near the front of the Screen, and the Maximum and Minimum Thermometers to others farther back. The height of the Screen should be such that the bulbs of the Dry and Wet Thermometers are four feet above the ground. The Screen should be painted white inside and out.

MAXIMUM AND MINIMUM THERMOMETERS.

In order that the MAXIMUM THERMOMETER may register the highest temperature of the day, the column of mercury is disconnected from the mercury in the bulb either by an air-bubble in the column (Phillip's pattern), or by the narrowing of the tube near the bulb (Negretti and Zambra's pattern). In either case the instrument is set by holding it vertically, bulb downwards, and gently shaking and tapping it so as to send the portion of the column that remained at the highest point attained back towards the bulb.

The MINIMUM THERMOMETER registers the lowest temperature by an index enclosed in the column of spirit which is drawn towards the bulb as the temperature falls, but remains stationary during any rise of temperature. The lowest reading is therefore the position of the end of the index furthest from the bulb. The instrument is set by inclining it bulb upwards till the index slips down to the end of the column of spirit. Care must be taken not to force any part of the index beyond the end of the spirit. Should this occur, however, or should portions of the spirit get detached and lodge in the upper part of the tube, it is generally possible to set the instrument right again by grasping it near the end furthest from the bulb and giving several rapid vertical swings at arm's length, so as to drive the spirit and index towards the bulb by centrifugal force.

Both Maximum and Minimum should be read and set at 9 P.M. The readings should be written down before the Thermometers are touched; and after setting, both should agree very nearly with the Dry Bulb temperature at that hour. Any difference from the Dry Bulb of more than a degree may be regarded by the Observer as an indication either that the instrument is not properly set, or that it is out of order.

DRY AND WET BULB THERMOMETERS.

The Hygrometer in use at the Society's Stations consists of two thermometers—a Dry and a Wet Bulb—of similar form, and usually mounted on one frame. The bulbs should project at least an inch from the frame, and the Wet Bulb be covered with muslin and connected by strands of cotton with the water cistern. This cistern should be placed an inch or two below the level of the bulbs and at the side of the Wet Bulb furthest from the Dry Bulb; it should not stand directly under the Wet Bulb. Muslins and strands are supplied to most stations from the Society's office, and should be renewed at least once a month. In putting on a fresh muslin care should be taken to touch it as little as may be with the fingers. In frosty weather the strands do not convey water to the muslin, but an accurate observation can generally be insured by soaking the Wet Bulb in water a quarter of an hour before the observation, as from the film of ice thus formed on the muslin evaporation goes on in the same way as from the wet muslin under ordinary circumstances.

RAIN GAUGE.

The Rain Gauge should be read at 9 A.M. each day, and the amount entered to the *previous day on the Schedule*: thus the quantity measured at 9 A.M. on the 5th should be put down on the line containing the observations of the 4th of the month, since out of the twenty-four hours ending at 9 A.M. on 5th, fifteen belong to the 4th and only nine to the 5th, so that the amount may more properly be credited to the former day. The monthly total for, say, January is thus what falls between 9 A.M. on 1st January and 9 A.M. on 1st February.

The measuring glass is divided to hundredths of an inch—the highest line indicating ·50, that is fifty hundredths or half an inch. The amount should be entered on the Schedule thus: if up to say the sixth line in the glass as ·06, if up to the twenty-third line as ·23, if up to the thirtieth line as ·30, and so on, there being always two figures put down to the right of the decimal point. Care should be taken to avoid entering ·08 as simply 8, or ·30 as ·3, as this may cause confusion when adding the figures to get the total for the month.

When the fall exceeds one fill of the measuring glass it is necessary to measure it in portions, and each successive reading should be jotted down on the flyleaf of the note-book or other convenient place before the glass is emptied. Thus after heavy rain the amounts measured might be:—

·47
·42
·38
1·27

The total, 1·27, would be entered on the Schedule.

The glass must be held vertically or placed on a level surface when reading. A little uncertainty is sometimes caused by the upward curvature of the water where it touches the side of the glass, but the true reading is half way between the two apparent edges of the water surface. When there is nothing in the gauge a stroke (——) should be entered on the Schedule rather than the figure 0.

Snow or Hail is counted as Rainfall, and should be melted and measured as such. The upper part of the gauge may be taken indoors, and what is lying in it thawed. To save time, especially if snow or rain be then falling, it is convenient to add a measured quantity of warm water to the snow in the gauge, this quantity being afterwards deducted from the total to get the amount that has fallen. The depth of snow lying on the ground should be noted in the Remarks column.

In gauges, such as Flemings, in which a float and measuring rod is used, the rod should be removed or tied down below the level of the rim, except when a measurement is being taken, because if allowed to project above the gauge, it would prevent it catching the true amount of fall.

If a gauge is only read once a month this should be done on the morning of the 1st, and the amount entered to the previous month.

The Rain Gauge should be placed in an open situation, if possible with no elevated objects close to it, in any case trees, walls, etc., should never be nearer to the gauge in horizontal distance than their own height. The gauge should be firmly fixed with its rim 12 inches above ground; if surrounded by grass, care must be taken that it is never allowed to grow as high as the rim. The gauges at most Stations are five inches in diameter, though a few of larger or smaller size are also in use. A convenient way of fixing a gauge in position is to drive four stout wooden pegs from 12 to 18 inches long into the ground, one at each side of the gauge.

WIND, CLOUD, SUNSHINE, ETC.

WIND.

The direction and force of the Wind should be noted at 9 A.M. and 9 P.M. In confined situations where the true direction cannot be easily observed, it is best to ascertain this by watching the movement of smoke from chimneys, or even of the lower clouds. The force of the wind should be noted according to the scale given on the other side of the Schedule.

At Stations where an Anemometer is in use, the readings at 9 A.M. each day should be put down in the column provided, the values being entered to the previous day, as in the case of the Rainfall.

CLOUDS.

The amount of Cloud should be estimated on the scale, 0 to 10, 0 indicating a clear and 10 an overcast sky. Only the part of the sky over 30° above the horizon should be taken into account, as it is impossible to estimate the space covered by Clouds nearer the horizon. A convenient table for noting briefly the species of Cloud will be found on the other side of the Schedule. It is desirable to note, if possible, the direction from which the Clouds are moving. If there is more than one layer of clouds on the sky, they should be noted.

Thus, for example,

Cir. W.	4
Cum. Str. S.W.	2

would indicate that four-tenths of the sky was covered with cirrus moving from the West, and two-tenths with cumulus moving from the S.W.

SUNSHINE.

This column is primarily for those Stations where a Sunshine Recorder is kept; at other Stations, however, the Observer may note in it the number of hours each day that the sun shines with sufficient clearness to cast a distinct shadow.

RADIATION THERMOMETERS.

A MAXIMUM THERMOMETER, with its bulb blackened and enclosed in an outer glass bulb exhausted of air, is used at many stations to register the highest temperature in the sun. It should be mounted horizontally about four feet above ground with its bulb pointing south, and should be read and set at 9 P.M.

A MINIMUM THERMOMETER on grass is used to register the lowest radiation temperature at night. It should be placed on wooden supports a few inches above the surface of the grass. It may be read and set at 9 P.M., but in warm weather, as the spirit in this instrument is liable to evaporate when exposed to bright sunshine and to condense again in the upper part of the tube, it is better to read it at 9 A.M., to put it inside the screen during the day, and to set and replace it at 9 P.M.

THERMOMETERS UNDER GROUND.

These should be read at 9 A.M., and the readings entered on the day on which they are made.

REMARKS.

In the Remarks column should be noted all occurrences of Snow, Hail, or Heavy Rain; of Thunder, or Lightning, or both together; of all Auroras, Meteors, or Halos round the sun or moon; Fogs, Gales or Storms, and generally of all noteworthy Weather phenomena.

The table and additional lines on the back of the Schedule are for the use of those Observers who wish to record Notes connected with the changes of the Seasons, such as the growth of Crops, Fruit, etc., and the migrations of Birds; also the prevalence of Diseases in man, in the lower animals, and in plants. Such observations are often of great interest and utility when taken in conjunction with the ordinary Meteorological records.

DATES IN CONNECTION WITH THE PERIODICAL RETURN OF THE SEASONS.

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

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

The Society will be glad to receive any portions of the information indicated in this table that may come under the Observer's notice.

ADDITIONAL REMARKS.

BOOK POST.

THE SECRETARY,
Scottish Meteorological Society,
122 George Street,
EDINBURGH.

Aberdeen
1909
June