

SCOTTISH METEOROLOGICAL SOCIETY.

Observations taken at Duthie Park, County of Aberdeen, During the MONTH of January 1908.

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.

[illegible]

BAROMETER.	Corrected Mean at 9 A.M., <i>minus</i> Correction for }	=	553
	Temp. = 36 }		
	Corrected Mean at 9 P.M., <i>minus</i> Correction for }	=	875
	Temp. = 39 }		
Mean at Station, corrected, and at 32°,		=	886
Correction for height, feet above Mean Sea-level,		= +	50
Mean, reduced to 32°, and Sea-level,		=	29936
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 16th, = 53.0

Lowest in Month, corrected for Index errors, on the 2th, = 25.0

Difference, or Monthly Range, = 27.4

Mean of all the Highest, = 41.5

Mean of all the Lowest, = 31.7

Difference, or Mean Daily Range, = 9.8

Mean Temperature of Month, $\frac{1}{2}$ (Mean Max. + Mean Min.), (-0.8) = 36.6

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, = 36.1
Wet Bulb, Mean of A.M. and P.M. Readings, = 34.3
Computed Temperature of Dew-Point, =
Do. Elastic Force of Vapour, = 179
Do. Relative Humidity (Saturation = 100), = 84
RAIN fell on 12 Days; Amount in Inches, = 1.07

WIND.		SUMMARY.							Calm or Variable.	Mean Force 0-12.
Direction.	N	NE	E	SE	S	SW	W	NW		
A.M.		2			4	20	2	3	0	25
P.M.	1	1		1	1	19	2	6	0	30
Sun.	1	3	0	1	5	36	4	9	0	38

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

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 or 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 written down, should be compared again with the scale.

DATES IN CONNECTION WITH THE PERIODICAL RETURN OF THE SEASONS.

FOREST TREES.	In Flower.	Leaf Buds first Appen.	In Leaf.	Divested of Leaves.	CROPS, marking variety.	Seeds or Planting.	Aspects above Ground.	In Ear or Flower.	First Cut or Raised.
Alder,					Barley,				
Ash,					Ber 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.	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.

METEOROLOGICAL OBSERVATIONS.

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 amounts 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 notebook or other convenient place before the glass is emptied. Thus after heavy rain the amounts measured might be :—

47
42
38
127

The total, 127, 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 Fennings, 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.

ADDITIONAL REMARKS.

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, 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 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; of 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.

SCOTTISH METEOROLOGICAL SOCIETY.

Observations taken at Dutton Park, Meriden, County of Connecticut, During the MONTH of February 1908.

Lat. 57.9 N, Long 26 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 5¹/₂ inches. Height of Rim of Gauge above Ground 12 inches

The Hours of Observation are of Greenwich Time.

[illegible]

BAROMETER.	Corrected Mean at 9 A.M., minus Correction for	=	29.756
	Temp. =	- .004	
	Corrected Mean at 9 P.M., minus Correction for	=	29.798
	Temp. =	- .009	
Mean at Station, corrected, and at 32°,.....		=	29.777
Correction for height, feet above Mean Sea-level,.....	= +		.050
Mean, reduced to 32°, and Sea-level,		=	.827
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 7th, = 54.0
Lowest in Month, corrected for Index errors, on the 29th, = 28.0
Difference, or Monthly Range, = 26.0
Mean of all the Highest, = 45.9
Mean of all the Lowest, = 34.9
Difference, or Mean Daily Range, = 10.0
Mean Temperature of Month, $\frac{1}{2}$ (Mean Max. + Mean Min.), = 40.4

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, = 39.7
Wet Bulb, Mean of A.M. and P.M. Readings, = 37.5
Computed Temperature of Dew-Point, =
Do. Elastic Force of Vapour, = 202
Do. Relative Humidity (Saturation = 100), = 82
RAIN fell on 14 Days; Amount in Inches, = 1.06

WIND.		SUMMARY.								
Direction.	N	NE	E	SE	S	SW	W	NW	Calm or Variable.	Mean Force 0-12.
A.M.	1	2	0	0	1	13	7	5	0	3-10.
P.M.	1	3	0	0	1	12	5	8	0	3-2.
Sun.	2	5	0	0	2	24	12	13	0	3-1.

Observations made and
Return verified by } Peter Hauger

(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

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 1/1000 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 readings after it is written down, should be compared again with the scale.

DATES IN CONNECTION WITH THE PERIODICAL RETURN OF THE SEASONS.

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

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

METEOROLOGICAL OBSERVATIONS.

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 amounts 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 notebook 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 Plumings, 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.

ADDITIONAL REMARKS.

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 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; of 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.



SCOTTISH METEOROLOGICAL SOCIETY.

Observations taken at Duthie Park Aberdeen, County of Aberdeen, During the MONTH of March 1908.
 Lat. 57° 9' N, Long. 2° 36' 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.				SELF-REGISTERING THERMOMETERS. Read Daily, at 9 P.M.				HYGROMETER.				RAIN.		WIND.				CLOUDS.				SUNSHINE. Hours.	THERMOMETERS under Ground.					GENERAL REMARKS. Occurrence of Snow, Hail, Thunder, Lightning, Fog, Gales, Meteors, Auroras, Remarkable Depression or Elevation of Barometer, etc. <i>Mention the hour at which Storms, including Thunder and Lightning, began and ended.</i>	Days of Month.																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																													
	9 A.M.		9 P.M.		Protected in Screen, 4 feet above Ground.		Black Bulb Max. in Sun.	Min. on Grass.	9 A.M.		9 P.M.		Amount at 9 A.M.	Direction.	Force. Scale of 0-12.	Direction.	Force. Scale of 0-12.	Ane- mometer. 9 A.M.	9 A.M.		9 P.M.			9 A.M.																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																			
	Barometer. No.	Attached Ther- mometer	Barometer. No.	Attached Ther- mometer	No.	No.			Dry bulb.	Wet bulb.	Dry bulb.	Wet bulb.							Species and Direction.	Amount (0-10).	Species and Direction.	Amount (0-10).		No. 3 ins.	No. 12 ins.	No. 22 ins.	No. 36 ins.	No. 48 ins.																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																															
inches.	°	inches.	°	°	°	°	°	°	°	inches.	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																														
1	29.600	43	29.750	44	40.2	39.2			36.2	35.4	36.0	34.5	0.08	N	2	N	2		Cir	10	Cir	8																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																					</

BAROMETER, Corrected Mean at 9 A.M., minus Correction for Temp. = 29.697
 Corrected Mean at 9 P.M., minus Correction for Temp. = 29.710
 Mean at Station, corrected, and at 32°, = 29.704
 Correction for height, feet above Mean Sea-level, = + 5.0
 Mean, reduced to 32°, and Sea-level, = 29.754
 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 28th, 20, = 57.5
 Lowest in Month, corrected for Index errors, on the 21th, = 35.0
 Difference, or Monthly Range, = 22.5
 Mean of all the Highest, = 44.7
 Mean of all the Lowest, = 33.8
 Difference, or Mean Daily Range, = 10.9
 Mean Temperature of Month, $\frac{1}{2}$ (Mean Max. + Mean Min.), = 39.3
 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, = 38.8
 Wet Bulb, Mean of A.M. and P.M. Readings, = 37.0
 Computed Temperature of Dew-Point, =
 Do. Elastic Force of Vapour, = 2.01
 Do. Relative Humidity (Saturation = 100), = 85
 RAIN fell on 22 Days; Amount in Inches, = 3.56

WIND.		SUMMARY.									
Direction.	N	NE	E	SE	S	SW	W	NW	Calm or Variable.	Mean Force 0-12.	
A.M.	2	1	0	9	6	8	2	3	0	2.9	
P.M.	2	2	0	6	9	7	1	4	0	2.6	
Sum.	4	3	0	15	15	15	3	7	0	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

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. Mercuial 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 1/1000 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 written down, should be compared again with the scale.

DATES IN CONNECTION WITH THE PERIODICAL RETURN OF THE SEASONS.

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

SHRUBS, ETC.	First in Blossom.	FRUITS.	Fruit Ripe generally.	First in Blossom.	MIGRATORY BIRDS.	First Arrival.	Departure.
Barberry,		Apple,			Cuckoo,		
Bouree or Elder,		Black Currant,			Curlow,		
Broom,		Cherry,			House-Swallow,		
Hazel,		Gean,			Lapwing,		
Hawthorn,		Gooseberry,			Plover,		
Holly,		Peach,			Stad-Martin,		
Laburnum,		Pear,			Starlings,		
Lilac,		Plum,			Swan,		
Mezeron,		Strawberry,			Rail or Corn Crane,		
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.

FOR TAKING METEOROLOGICAL OBSERVATIONS.

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, and 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 notebook 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 Floppings, 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 13 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.

ADDITIONAL REMARKS.

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 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 Show, 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.



SCOTTISH METEOROLOGICAL SOCIETY.

Observations taken at Beithie Park, Aberdeen, County of Aberdeen, During the MONTH of April 1908.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.				SELF-REGISTERING THERMOMETERS. Read Daily, at 9 P.M.				HYGROMETER.		RAIN.	WIND.				CLOUDS.				SUNSHINE. Hours.	THERMOMETERS under Ground.					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.				
	9 A.M.		9 P.M.		Protected in Screen, 4 feet above Ground.		Black Bulb Max. in Sun.	Min. on Grass.	9 A.M.			9 P.M.		9 A.M.		9 P.M.		9 A.M.			9 A.M.										
	Barometer. No.	Attached Thermometer.	Barometer. No.	Attached Thermometer.	Max. No.	Min. No.			Dry bulb.	Wet bulb.		Amount at 9 A.M.	Direc- tion.	Force, Scale of 0-12.	Direc- tion.	Force, Scale of 0-12.	Ane- mometer. 9 A.M.	Species and Direc- tion.	Amount (0-10).		Species and Direc- tion.	Amount (0-10).	No. 3 ins.	No. 12 ins.	No. 22 ins.			No. 36 ins.	No. 48 ins.		
inches.	°	inches.	°	°	°	°	°	inches.																							
1	29.615	46.	29.850	47.	49.0	34.0			42.6	37.5	41.0	37.5	0.00	N	4	NW	2	0	0	Ci	6							Fair cool more settled like	1		
2	29.675	49.	29.525	50.	52.5	39.7			45.8	45.0	45.0	41.0	0.00	S	4	SW	2	8	4	—	0							Fair fine all day clear P.M.	2		
3	29.370	49.	29.601	50.	50.0	39.0			46.0	42.0	42.0	41.0	0.60	SW	2	NW	4	ci	4	n	10.								Fair fine up till 2 P.M. then showers frequent	3	
4	29.750	49.	29.950	49.	47.0	34.5			41.1	39.0	42.5	41.0	0.14	NW	4	NW	4	ci	8	ci	8.								showers frequent all day.	4	
5	30.125	46.	30.350	47.	47.0	38.8			41.0	39.6	41.0	38.0	0.00	NW	6	N	2	ci	8	—	0								showers, clear from 2 P.M. then fine	5	
6	30.425	47.	30.475	49.	51.0	35.6			43.6	41.0	40.0	38.0	0.00	NW	2	SW	2	ci	6.		0								Fair fine all day from mild.	6	
7	30.400	47.	30.290	51.	54.6	31.6			42.8	39.0	44.0	42.0	0.00	SW	2	SW	4	ci	6	ci	8.									white frost clear fine all day.	7
8	30.240	50.	30.175	50.	50.0	42.0			47.8	46.0	45.0	44.0	0.47	SW	1	SE	1	n	10	fog.										dull air slight rain afternoon.	8
9	30.050	48.	30.050	50.	44.0	42.8			44.0	43.6	44.5	39.0	0.22	SE	2	NB.	2	n	10	ci	6.									heavy rainfall P.M. (clearing)	9
10	30.000	47.	29.900	48.	50.0	37.0			42.0	39.8	44.6	43.0	0.00	S	2	SE	2	ci	8	ci	6.									Fair, some sunshine dull P.M.	10
11	29.875	50	30.055	47.	50.2	41.0	X		46.0	43.4	42.0	40.5	0.03	SE	2	SE	1	ci	8	ci	2.									Fair fine all day.	11
12	30.200	48	30.310	47.	50.0	35.0			43.2	42.0	40.0	38.0	0.00	SE	2	S	1	n	10	ci	4									Fair, dull all day.	12
13	30.300	46.	30.400	50.	52.5	33.0			48.0	44.6	42.0	40.0	0.00	SE	1	E	2	ci	2	ci	8.									Fair, clear white frost, fine all day.	13
14	30.455	48.	30.310	50.	50.6	33.0			44.5	41.6	42.0	40.0	0.00	NB.	2	NB.	2	ci	2	ci	0									Fair fine all day.	14
15	30.500	49.	30.600	51.	57.0	35.6			44.7	42.0	43.5	41.5	0.00	NB.	2	NB.	2	ci	6	ci	8									Fair, cold drying weather.	15
16	30.645	48.	30.600	50.	52.5	33.4			44.2	42.0	44.0	41.0	0.00	NW	2	N	2	ci	8	ci	6.									Fair, dull white frost fine	16
17	30.425	49.	30.175	52.	61.0	41.2			45.0	42.0	46.0	43.0	0.04	NB.	2	NW	4	ci	5	n	10									Fair, till 2 P.M. then slight rain	17
18	30.150	49.	30.025	49.	44.0	38.0	?		41.8	36.8	42.5	40.0	0.00	N	4	N	4	ci	10	ci	8.									Fair, dull cold all day.	18
19	29.875	48.	29.900	48.	46.0	36.0			41.8	37.0	42.5	38.0	0.03	NB.	6	NB.	4	ci	4	ci	6.									Fair, cold stormy wind, slight rain	19
20	29.900	46.	29.750	49.	49.4	33.0			40.6	37.0	41.4	39.0	0.06	NW	2	NW	2	ci	8	ci	4.									Fine, fair all day, showers P.M.	20
21	29.750	46.	29.775	49.	46.6	36.1			40.5	37.0	41.5	38.0	0.04	NW	2	NW	2	ci	8	ci	8.									Fair, cold all day unsettled	21
22	29.700	45.	29.750	48.	41.4	33.0			38.1	35.2	36.0	34.0	0.05	NW	2	N	4	ci	8	—										been thick snow P.M. frequent	22
23	29.710	45	29.640	45	39.2	25.5			33.2	30.0	33.6	26.0	0.00	N	4	N	1	ci	6	—										snow, lying on Inch, snow P.M.	23
24	29.525	40	29.420	44.	41.0	20.0			36.0	32.6	35.0	33.0	0.00	NB.	2	NB.	2	ci	3	ci	5.									Fair, hardest frost for 24 hrs.	24
25	29.400	43.	29.675	46.	45.0	28.0			42.0	38.0	40.0	31.8	0.00	S	4	S.	4	ci	4	ci	8.									Fair, cold, some snow showers	25
26	29.650	47.	29.610	47.	46.0	35.0			45.0	40.1	41.0	39.0	0.14	SE	4	NB.	2	ci	8	n	10									Fair cold, light rain from 12	26
27	29.750	45	29.900	49.	57.8	40.0			44.0	42.0	40.2	38.1	0.00	NB.	2	SE	2	ci	8	0	0									Fair dull fair. more mild.	27
28	29.900	49.	29.950	46.	49.5	39.0			45.0	41.4	41.5	40.0	0.00	SE	2	SE	2	ci	5	—										Fair cool all day.	28
29	30.060	49.	30.175	57.	53.0	35.0			46.4	44.6	43.4	41.0	0.00	SE	2	SE	2	ci	4	ci	5.									Do.	29
30	30.150	57.	30.080	52.	47.0	41.0			46.0	44.0	44.8	44.0	0.25	SE	2	SE	2	ci	8	n	10									Fair dull slight rain from 10	30
31																															
Sums.	14105	18	5114	14	13	14			128	136	86	112	4		80				183		48										
Means.	29.679	46.6	30.001	48.7	48.0	35.8			43.2	40.2	44.8	38.8	✓		27				61		49										
Corrections for Instrumental Errors.	-0.10		-0.15																												
Corrections for Diurnal Range.																															
Corrected Means	29.779		29.991																												

NOTATION USED IN GENERAL REMARKS.									
a.	denotes aurora.								
d.	" drizzling rain.								
f.	" fog.								
fr.	" frost.								
h. fr.	" hoar-frost.								
h.	" haze.								
l.	" hail.								
li.	" lightning.								
lu. co.	" lunar corona.								
lu. ha.	" lunar halo.								
m.	" mist.								
p.	" passing showers.								
r.	" rain.								
r. s.	" heavy rain.								
sl.	" sleet.								
sn.	" snow.								
so. ha.	" solar halo.								
s.	" squall.								
s. s.	" 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.		FORCE.		FORCE.	
0	Calm.	5	Fresh Breeze.	9	Strong Gale.	13	Violent Storm.	17	Hurricane.
1	Light Air.	6	Strong Breeze.	10	Whole Gale.	14	Storm.	18	
2	Light Breeze.	7	Moderate Gale.	11	Storm.	15	Storm.	19	
3	Gentle Breeze.	8	Fresh Gale.	12	Hurricane.	16	Storm.	20	
4	Moderate Breeze.								

BAROMETER. Corrected Mean at 9 A.M., minus Correction for Temp. = 29.931
Corrected Mean at 9 P.M., minus Correction for Temp. = 29.937
Mean at Station, corrected, and at 32°, = 29.934
Correction for height, feet above Mean Sea-level, = 50
Mean, reduced to 32°, and Sea-level, = 29.984
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 7 th, = 61.0
Lowest in Month, corrected for Index errors, on the 24 th, = 20.0
Difference, or Monthly Range, = 41.0
Mean of all the Highest, = 48.8
Mean of all the Lowest, = 35.8
Difference, or Mean Daily Range, = 13.0
Mean Temperature of Month, $\frac{1}{2}$ (Mean Max. + Mean Min.), = 42.3
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, = 42.5
Wet Bulb, Mean of A.M. and P.M. Readings, = 39.5
Computed Temperature of Dew-Point, =
Do. Elastic Force of Vapour, = 2.11
Do. Relative Humidity (Saturation = 100), = 78
Rain fell on 17 Days; Amount in Inches, = 1.57

WIND.		SUMMARY.						
Direction.	N	NE	E	SE	S	SW	W	NW
A.M.	2	5	0	8	3	3	1	8
P.M.	5	6	1	7	2	3	6	0
Sum.	7	11	1	15	5	6	7	8

Observations made and Return verified by Peter Thompson

(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

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.

FOURTH 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 1/1000 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 written down, should be compared again with the scale.

FOR TAKING

STEVENSON SCREEN.

The Maximum, Minimum, Dry Bulb, and Wet Bulb Thermometers should be placed in a louvered 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.

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 generally.	MIGRATORY BIRDS.	First Arrival.	Departure.
Barberry,		Apple,		Cuckoo,		
Bountree 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,		
Mezeron,		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.

METEOROLOGICAL OBSERVATIONS.

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 6th, 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 .30, that is fifty hundredths or half an inch. The amounts 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 notebook 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.

ADDITIONAL REMARKS.

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 2 would indicate that four-tenths of the sky was covered with cirrus moving from the West, and two-tenths with cirrulus 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 sun or moon; of all Auroras, Meteors, or Halos round the sun or moon; of 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.



SCOTTISH METEOROLOGICAL SOCIETY.

Observations taken at Duthie Park, Aberdeen, County of Aberdeen, During the MONTH of May 1908.Lat. 57° 11', 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.				SELF-REGISTERING THERMOMETERS. Read Daily, at 9 P.M.				HYGROMETER.				RAIN.	WIND.				CLOUDS.				SUNSHINE. Hours.	THERMOMETERS under Ground.					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.																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																				
	9 A.M.		9 P.M.		Protected in Screen, 4 feet above Ground.		Black Bulb Max. in Sun.	Min. on Grass.	9 A.M.		9 P.M.			9 A.M.		9 P.M.		9 A.M.		9 P.M.			9 A.M.																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																										
	Barometer. No.	Attached Thermometer	Barometer. No.	Attached Thermometer	Max. No.	Min. No.			Dry bulb.	Wet bulb.	Dry bulb.	Wet bulb.		Amount at 9 A.M.	Direction.	Force. Scale of 0-12.	Direction.	Force. Scale of 0-12.	Amount at 9 A.M.	Species and Direction.	Amount (0-10).		Species and Direction.	Amount (0-10).	No. 3 ins.	No. 12 ins.	No. 22 ins.			No. 36 ins.	No. 48 ins.																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																		
1	30.100	57	30.155	53	57.0	43.0			47.0	46.2	45.5	43.0	0.09	SE	2	SE	2		20	10	N	10																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																											

BAROMETER, Corrected Mean at 9 A.M., minus Correction for Temp. = 29.857
Corrected Mean at 9 P.M., minus Correction for Temp. = 29.874
Mean at Station, corrected, and at 32°, = 29.866
Correction for height, feet above Mean Sea-level, = + 49
Mean, reduced to 32°, and Sea-level, = 29.915
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 27th, = 76.0
Lowest in Month, corrected for Index errors, on the 26th, = 36.0
Difference, or Monthly Range, = 40.0
Mean of all the Highest, = 60.3
Mean of all the Lowest, = 43.9
Difference, or Mean Daily Range, = 16.4
Mean Temperature of Month, $\frac{1}{2}$ (Mean Max. + Mean Min.), = 52.1
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, = 57.3
Wet Bulb, Mean of A.M. and P.M. Readings, = 47.9
Computed Temperature of Dew-Point, =
Do. Elastic Force of Vapour, = 2.94
Do. Relative Humidity (Saturation = 100), = 77
RAIN fell on 13 Days; Amount in Inches, = 1.39.

WIND.		SUMMARY.									
Direction.	N	NE	E	SE	S	SW	W	NW	Calm or Variable.	Mean Force 0-12.	
A.M.		1	6	4	6	10	4			2.3	
P.M.		2	3	7	7	9	2	1	0	2.3	
Sum.	0	3	9	11	13	19	6	1	0	2.3	

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

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 or 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 readings after it is written down, should be compared again with the scale.

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 Out or Rased.
Alder,					Barley,				
Ash,					Bere or Bigg,				
Beech,					Oats,				
Birch,					Wheat,				
Elm,					Beans,				
Larch,					Pease,				
Lime,					Potatoes,				
Oak,					Turnips,				
Sycamore or Plane,					Eye Grass,				

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

METEOROLOGICAL OBSERVATIONS.

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 amounts 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 notebook 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.

ADDITIONAL REMARKS.

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 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.



SCOTTISH METEOROLOGICAL SOCIETY.

Observations taken at Duthie Park Aberdeen, County of Aberdeen, During the MONTH of June 1908.

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.

[illegible]

BAROMETER.	Corrected Mean at 9 A.M., minus Correction for Temp. =	99.987
	Corrected Mean at 9 P.M., minus Correction for Temp. =	29.988
	Mean at Station, corrected, and at 32°.....	99.988
	Correction for height, feet above Mean Sea-level,.....	+ 48
	Mean, reduced to 32°, and Sea-level,	103.6
	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 25th, 28..... = 75.

Lowest in Month, corrected for Index errors, on the 12th, = 37.

Difference, or **Monthly Range**, = 38.

Mean of all the Highest, = 63.3

Mean of all the Lowest, = 47.0

Difference, or **Mean Daily Range**, = 16.3

Mean Temperature of Month, $\frac{1}{2}$ (Mean Max. + Mean Min.), = 55.2

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,	=	55.8
Wet Bulb, Mean of A.M. and P.M. Readings,	=	50.5
Computed Temperature of Dew-Point,	=	
Do. Elastic Force of Vapour,	=	325
Do. Relative Humidity (Saturation = 100), =		78.
RAIN fell on 14 Days; Amount in Inches,	=	1.49.

WIND.		SUMMARY.								Calm or Variable.	Mean Force 0-12.
Direction.	N	NE	E	SE	S	SW	W	NW			
A.M.	3	3	2	7	2	9		4		27	
P.M.	3	4	3	7	2	7		4		24	
Sum.	6	7	5	14	4	16	0	8	0	26.	

Observations made and
Return verified by { Peter Hampton

(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

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 or 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 1-1000 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, 29-365, or 29-315. Experience having shown that even the best Observers occasionally make these mistakes, the reading, after it is written down, should be compared again with the scale.

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 Out or Rained.
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 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 Crane,		
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.

METEOROLOGICAL OBSERVATIONS.

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 amounts 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 notebook 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.

ADDITIONAL REMARKS.

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 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.

SCOTTISH METEOROLOGICAL SOCIETY.

Observations taken at Duffus Park, Aberdeen, County of Aberdeen, During the MONTH of July 1908.

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

The Hours of Observation are of Greenwich Time.

Days of Month.	BAROMETER.				SELF-REGISTERING THERMOMETERS. Read Daily, at 9 P.M.				HYGROMETER.		RAIN.	WIND.				CLOUDS.				SUNSHINE. Hours.	THERMOMETERS under Ground.					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.																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																							
	9 A.M.		9 P.M.		Protected in Screen, 4 feet above Ground.	Black Bulb Max. in Sun.	Min. on Grass.	9 A.M.		9 P.M.		Amount at 9 A.M.	9 A.M.		9 P.M.		Ane- mometer. 9 A.M.	9 A.M.			9 P.M.		9 A.M.																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																											
	Barometer. No.	Attached Thermometer	Barometer. No.	Attached Thermometer				Dry bulb.	Wet bulb.	Dry bulb.			Wet bulb.	Direction.	Force. Scale of 0-12.	Direction.		Force. Scale of 0-12.	Species and Direc- tion.		Amount (0-10).	Species and Direc- tion.	Amount (0-10).	No. 3 ins.	No. 12 ins.			No. 22 ins.	No. 36 ins.	No. 48 ins.																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																				
																															inches.	°	inches.	°	°	°	inches.	°	°	°	°	°	°	°	°	°	°	°	°	°	°																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																															
1	30.430	60	30.425	61	69.5	62.0			600	56.8	550	53.5	0.00	S	2	SW	1		bi	2	bi	2																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																												

BAROMETER. Corrected Mean at 9 A.M., minus Correction for Temp. = 29.893
 Corrected Mean at 9 P.M., minus Correction for Temp. = 29.893
 Mean at Station, corrected, and at 32°, = 29.893
 Correction for height, feet above Mean Sea-level, = 48
 Mean, reduced to 32°, and Sea-level, = 29.941
 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 2 th, = 77
 Lowest in Month, corrected for Index errors, on the 6 th, = 39
 Difference, or Monthly Range, = 38
 Mean of all the Highest, = 64.6
 Mean of all the Lowest, = 50.5
 Difference, or Mean Daily Range, = 14.1
 Mean Temperature of Month, $\frac{1}{2}$ (Mean Max. + Mean Min.), = 57.6
 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, = 57.0
 Wet Bulb, Mean of A.M. and P.M. Readings, = 54.1
 Computed Temperature of Dew-Point, =
 Do. Elastic Force of Vapour, = 380
 Do. Relative Humidity (Saturation = 100), = 82
 RAIN fell on 12 Days; Amount in Inches, = 2.33

WIND.		SUMMARY.									
Direction.	N	NE	E	SE	S	SW	W	NW	Calm or Variable.	Mean Force 0-12.	
A.M.	1	3		4	7	6	3	7	0	2.3	
P.M.	2	3	4	3	8	5	0	6	0	1.9	
Sum.	3	6	4	7	15	11	3	13	0	2.1	

Observations made and
Return verified by P. 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

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.

FOREIGN 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 edges 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 1/1000 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, 29.365, or 29.315. Experience having shown that even the best Observers occasionally make these mistakes, the reading, after it is written down, should be compared again with the scale.

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 Out or Harvest.
Alder,					Barley,				
Ash,					Bere or Bigg,				
Beech,					Oats,				
Birch,					Wheat,				
Elm,					Peas,				
Larch,					Potatoes,				
Lime,					Turnips,				
Oak,					Rye Grass,				
Sycamore or Plane,									

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

FOR TAKING METEOROLOGICAL OBSERVATIONS.

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 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 notebook 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 Fall 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 Fleming's, 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.

ADDITIONAL REMARKS.

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 for 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 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; of 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.



SCOTTISH METEOROLOGICAL SOCIETY.

Observations taken at Dunfermline, Fife, County of Fife, During the MONTH of August 1908.Lat. 55° 54' N, Long. 2° 16' W, Distance from Sea 2 miles. Height of Cistern of the Barometer above Mean Sea-Level 42 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.				SELF-REGISTERING THERMOMETERS.				HYGROMETER.				RAIN.	WIND.				CLOUDS.				SUNSHINE.	THERMOMETERS under Ground.					GENERAL REMARKS.	Days of Month.				
	9 A.M.		9 P.M.		Protected in Screen, 4 feet above Ground.		Black Bulb, Max. in Sun.		Min. on Grass.		9 A.M.			9 P.M.		9 A.M.		9 P.M.		9 A.M.			9 P.M.		9 A.M.								
	Barometer.	Attached Thermometer.	Barometer.	Attached Thermometer.	No.	Min.	No.	Min.	No.	Min.	Dry bulb.	Wet bulb.		Dry bulb.	Wet bulb.	Amount at 9 A.M.	Direction.	Force.	Direction.	Force.	Amount at 9 A.M.		Direction.	Force.	Amount at 9 A.M.	Direction.	Force.			No.	No.	No.	No.
1	30.250	60.	30.315	61.0	64.0	68.0	58.8	52.0	61.0	54.0	0.00	NW	4	NW	2	ci	3	ci	5													fair cool day all day	1
2	30.400	65.	30.350	61.	62.0	54.5	64.0	63.0	54.0	55.0	0.00	NW	2	SW	1	ci	8	ci	0												fair mild & fine all day.	2	
3	30.250	65.	30.125	61.	68.5	52.2	64.0	65.1	54.0	54.0	0.00	NW	1	NW	2	ci	8	ci	8												fair, partial cloud - fair later	3	
4	30.038	61.	29.950	60.	65.0	50.0	64.0	62.0	54.0	55.0	0.11	SW	2	SW	2	ci	8	cu	8												fair, showers after 12 noon	4	
5	29.960	59.	30.190	58.	60.5	51.6	54.5	54.0	54.0	54.0	0.00	N	4	N	6	ci	8	cu	10												wild stormy, some slight rain	5	
6	30.200	60.	30.200	60.	69.0	49.6	59.8	55.2	56.0	52.0	0.60	NW	2	S	1	ci	2	ci	5												fair & fine mild all day.	6	
7	30.200	60.	30.250	59.	65.0	52.0	54.5	54.8	54.0	52.0	0.00	S	1	N/E	1	ci	8	ci	8												fair, dull fine all day.	7	
8	30.150	60.	30.000	61.	70.0	45.0	54.5	53.0	54.0	52.8	0.03	S	1	N/E	1	ci	2	ci	6												fair clear showers 8 P.M.	8	
9	30.000	59.	29.750	62.	70.0	47.0	54.5	52.0	55.0	53.5	0.35	S	1	SW	1	ci	3	ci	8												fair clear very fine windy later	9	
10	29.630	58.	29.830	61.	66.4	53.0	56.0	58.0	58.4	52.3	0.03	SW	1	SW	6	n	8	cu	4												been fine soft rain fair through afternoon	10	
11	30.000	58.	30.200	55.	60.8	43.0	52.0	46.8	48.0	44.0	0.05	NW	1	NW	4	cu	4														fair cool clear & fine P.M.	11	
12	30.225	54.	30.150	54.	61.0	38.0	52.0	48.0	48.0	44.6	0.00	NW	4	N	2	cu	5														cool some slight rain - do.	12	
13	30.000	56.	29.945	53.	61.0	36.2	53.0	47.0	53.0	50.2	0.00	NW	4	N	6	ci	5	cu	8												cool fair cold North East 2 P.M.	13	
14	30.025	58.	30.150	64.	61.5	51.0	54.0	52.6	54.0	52.0	0.00	NW	4	E	1	ci	6	n	10												cool fair & fine all day.	14	
15	30.200	59.	30.215	54.	62.0	52.0	58.0	56.0	53.0	51.0	0.00	S	2	S	1	ci	6														mild fair all day	15	
16	30.230	59.	30.260	58.	61.0	48.4	58.8	50.4	53.0	50.6	0.00	S	1	S	2	fog	10	ci	10												fair & fine all day.	16	
17	30.250	56.	30.245	56.	60.0	49.2	54.6	51.0	52.0	50.6	0.00	NW	4	NW	4	cu	10	cu	10												do	17	
18	30.305	58.	30.300	54.	55.0	44.2	54.0	52.5	53.0	51.0	0.01	NW	4	SW	2	cu	10	cu	10												dull damp fog dull P.M.	18	
19	30.300	56.	30.245	58.	64.0	48.8	52.0	50.0	52.5	51.0	0.00	NW	2	N	1	cu	10	cu	8												do	19	
20	30.250	54.	30.150	58.	55.0	48.9	51.0	49.6	51.5	50.0	0.01	N	1	N/E	1	cu	10	cu	10												do	20	
21	29.950	56.	29.855	58.	60.0	50.0	52.2	52.0	55.0	52.0	0.00	N/E	1	S	1	cu	10	cu	6												do	21	
22	29.750	54.	29.750	56.	61.0	50.0	53.5	56.0	53.0	52.0	0.43	S	1	Var		cu	6	n	10												fair, heavy rain afternoon & evening	22	
23	29.745	58.	29.490	56.	61.0	43.0	51.0	49.6	49.0	47.0	0.01	W	1	S/E	1			ci	6												clear & fine all day	23	
24	29.700	60.	29.550	56.	65.0	48.0	53.0	51.0	54.0	51.0	0.34	S	4	S	2	cu	4	n	10												fair, some night rain distant thunder.	24	
25	29.400	61.	29.455	60.	65.2	53.8	60.1	58.4	56.0	54.0	0.02	S	1	SW	1	cu	6	cu	8												fair dull rain afternoon & evening	25	
26	29.535	60.	29.300	61.	63.2	49.0	54.8	55.0	56.0	55.0	0.33	NW	2	SW	2	cu	8	n	10												fair fine heavy rain, later night	26	
27	29.175	60.	29.175	60.	61.0	49.0	54.8	51.6	56.5	52.0	0.00	W	6	W	6	cu	10														been heavy rain fair 9 A.M. fine all day	27	
28	29.150	60.	29.150	59.	65.0	52.0	58.0	54.0	54.5	56.0	0.00	SW	4	SW	4	cu	5	cu	8												fair & fine all day	28	
29	29.150	58.	29.550	54.	61.0	50.0	56.0	53.2	48.0	44.0	0.00	SW	4	NW	2	cu	4	ci	8												fair & fine all day. cool.	29	
30	29.625	59.	29.650	58.	61.2	44.5	53.5	54.6	54.0	54.0	0.00	SW	4	SW	4	ci	8	ci	6												do do mild	30	
31	29.710	57.	29.350	58.	63.2	48.5	53.5	52.8	51.0	49.5	0.38	N/E	6	N/E	6	ci	8	cu	10												been very heavy rain	31	
Sums.	1684	15	1213	14	9.8	15.5	168	137	153	103	24	50	76		203	210																	
Means.	928	58.9	919	58.4	63.4	48.5	56.7	53.8	53.9	51.6	2.6	2.5		6.5	6.8																		
Corrections for Instrumental Errors.	-0.10		-0.10																														
Corrected Means	-918		909																														

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.		

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

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

BAROMETER. Corrected Mean at 9 A.M., minus Correction for Temp. = 29.836
Corrected Mean at 9 P.M., minus Correction for Temp. = 29.829
Mean at Station, corrected, and at 32° = 29.823
Correction for height, feet above Mean Sea-level, = 48
Mean, reduced to 32°, and Sea-level, = 29.891
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 2 th, = 72.1
Lowest in Month, corrected for Index errors, on the 13 th, = 36.1
Difference, or Monthly Range, = 36
Mean of all the Highest, = 63.4
Mean of all the Lowest, = 48.5
Difference, or Mean Daily Range, = 14.9
Mean Temperature of Month, $\frac{1}{2}$ (Mean Max. + Mean Min.), = 56.0
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, = 55.3
Wet Bulb, Mean of A.M. and P.M. Readings, = 52.7
Computed Temperature of Dew-Point, =
Do. Elastic Force of Vapour, = 36.4
Do. Relative Humidity (Saturation = 100), = 83
RAIN fell on 13 Days; Amount in Inches, = 0.43
2.10

WIND.		SUMMARY.									
Direction.	N	NE	E	SE	S	SW	W	NW	Calm or Variable.	Mean Force 0-12.	
A.M.	2	2	0	0	8	5	3	11			
P.M.	4	4	1	1	5	8	1	6	1		
Sum.	6	6	1	1	13	13	4	17	1	26	

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.

EDINBURGH.

THE SECRETARY,

Scottish Meteorological Society,

122 George Street,

EDINBURGH.



BOOK POST.

STEVENSON SCREEN.

The Maximum, Minimum, Dry Bulb, and Wet Bulb Thermometers should be placed in a louvered 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. Muslin and strands are applied 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.

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,					Pere 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 generally.	MIGRATORY BIRDS.	First Arrival.	Departure.
Barberry,		Apple,		Cuckoo,		
Boutree or Elder,		Black Currant,		Curlew,		
Broom,		Cherry,		House-Swallow,		
Hazel,		Gean,		Lapwing,		
Hawthorn,		Gooseberry,		Plover,		
Holly,		Peach,		Sand-Martin,		
Laburnum,		Pear,		Starling,		
Lilac,		Plum,		Swan,		
Mezereum,		Strawberry,		Rail or Corn Crike,		
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.

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 written down, should be compared again with the scale.

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 notebook 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 Fleming's, 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 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; of 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.

ADDITIONAL REMARKS.

SCOTTISH METEOROLOGICAL SOCIETY.

Observations taken at Dunbarton, County of Aberdeen, During the MONTH of September 1908.

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.				SELF-REGISTERING THERMOMETERS. Read Daily, at 9 P.M.				HYGROMETER.		RAIN.	WIND.				CLOUDS.				SUNSHINE. Hours.	THERMOMETERS under Ground.					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.																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																					
	9 A.M.		9 P.M.		Protected in Screen, 4 feet above Ground.	Black Bulb Max. in Sun.	Min. on Grass.	9 A.M.		9 P.M.		9 A.M.		9 P.M.		Amount at 9 A.M.	9 A.M.		9 P.M.		9 A.M.																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																											
	Barometer. No.	Attached Ther- mometer.	Barometer. No.	Attached Ther- mometer.				Dry bulb.	Wet bulb.	Dry bulb.		Wet bulb.	Direction.	Force. Scale of 0-12.	Direction.		Force. Scale of 0-12.	Species and Direction.	Amount (0-10).		Species and Direction.	Amount (0-10).	No. 3 ins.	No. 12 ins.	No. 22 ins.			No. 36 ins.	No. 48 ins.																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																			
inches.	°	inches.	°	No.	No.	No.	No.	°	°	°	°	inches.																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																				

BAROMETER. Corrected Mean at 9 A.M., minus Correction for Temp. = 77.1
 Corrected Mean at 9 P.M., minus Correction for Temp. = 80.3
 Mean at Station, corrected, and at 32°, = 78.7
 Correction for height, feet above Mean Sea-level, = + 4.9
 Mean, reduced to 32°, and Sea-level, = 83.6
 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, = 68.0
 Lowest in Month, corrected for Index errors, on the 5 th, = 35.0
 Difference, or Monthly Range, = 33.0
 Mean of all the Highest, = 58.9
 Mean of all the Lowest, = 47.1
 Difference, or Mean Daily Range, = 11.8
 Mean Temperature of Month, $\frac{1}{2}$ (Mean Max. + Mean Min.), = 53.0
 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, = 52.7
 Wet Bulb, Mean of A.M. and P.M. Readings, = 51.2
 Computed Temperature of Dew-Point, =
 Do. Elastic Force of Vapour, = 3.56
 Do. Relative Humidity (Saturation = 100), = 89
 Rain fell on 22 Days; Amount in Inches, = 3.43

WIND.									SUMMARY.		
Direction.	N	NE	E	SE	S	SW	W	NW	Caln or Variable.	Mean Force 0-12.	
A.M.	1	6	1	4	6	4	3	5			
P.M.	1	3		5	5	5	1	9	1		
Sun.	2	9	1	9	11	9	4	14	1	2.3	

Observations made and Return verified by Peter H. H. H.
 (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

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. Mercuial 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 written down, should be compared again with the scale.

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 Out 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, generally.	MIGRATORY BIRDS.	First Arrival.	Departure.
Barberry,		Apple,		Cuckoo,		
Bountree 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 Crane,		
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.

FOR TAKING METEOROLOGICAL

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 '90, that is fifty hundredths or half an inch. The amounts 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 notebook 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.

ADDITIONAL REMARKS.

OBSERVATIONS.

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 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.



SCOTTISH METEOROLOGICAL SOCIETY.

Observations taken at Duthie Park Aberdeen County of Aberdeen, During the MONTH of October 1908.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.				SELF-REGISTERING THERMOMETERS. Read Daily, at 9 P.M.				HYGROMETER.		RAIN.	WIND.					CLOUDS.				SUNSHINE. Hours.	THERMOMETERS under Ground.					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.																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																									
	9 A.M.		9 P.M.		Protected in Screen, 4 feet above Ground.	Black Bulb Max. in Sun.	Min. on Grass.	9 A.M.		9 P.M.		Amount at 9 A.M.	9 A.M.		9 P.M.		Ane- mometer. 9 A.M.	9 A.M.		9 P.M.		9 A.M.																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																															
	Barometer. No.	Attached Thermometer.	Barometer. No.	Attached Thermometer.				Dry bulb.	Wet bulb.	Direction.			Force. Scale of 0-12.	Direction.	Force. Scale of 0-12.	Species and Direction.		Amount (0-10).	Species and Direction.	Amount (0-10).		No. 3 ins.	No. 12 ins.	No. 22 ins.	No. 36 ins.	No. 48 ins.																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																											
inches.	°	inches.	°	No.	No.	No.	No.	Dry bulb.	Wet bulb.	inches.	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°

BAROMETER. Corrected Mean at 9 A.M., minus Correction for Temp. = 30.064
Corrected Mean at 9 P.M., minus Correction for Temp. = 30.072
Mean at Station, corrected, and at 32°, = 30.068
Correction for height, feet above Mean Sea-level, = 49
Mean, reduced to 32°, and Sea-level, = 117
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 2th, 3th, = 72
Lowest in Month, corrected for Index errors, on the 25th, 26th, = 32
Difference, or Monthly Range, = 40
Mean of all the Highest, = 56.9
Mean of all the Lowest, = 47.2
Difference, or Mean Daily Range, = 9.7
Mean Temperature of Month, $\frac{1}{2}$ (Mean Max. + Mean Min.), = 52.1
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, = 51.4
Wet Bulb, Mean of A.M. and P.M. Readings, = 49.7
Computed Temperature of Dew-Point, =
Do. Elastic Force of Vapour, = 336
Do. Relative Humidity (Saturation = 100), = 89
RAIN fell on 9 Days; Amount in Inches, = 2.65

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

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

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 or 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 1/1000 inch, 0.100 inch, and 0.050 inch; this 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 written down, should be compared again with the scale.

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.	Appearance above Ground.	In Ear or Flower.	First Cut or Falsed.
Alder,					Barley,				
Ash,					Bere or Bigg,				
Beech,					Oats,				
Breth,					Wheat,				
Elm,					Beans,				
Larch,					Pease,				
Lime,					Potatoes,				
Oak,					Turnips,				
Sycamore or Plane,					Rye Grass,				

SERIES, ETC.	First in Blossom.	FRUITS.	First in Blossom 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.

METEOROLOGICAL OBSERVATIONS.

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 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.

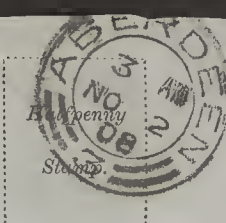
These should be read at 9 A.M., and the readings entered on the day on which they are made.

REMARKS.

In the Remarks column should be noted all occurrences of Snow, Hail, or Heavy Rain; of Thunder, or Lightning, or sun or moon; of all Auroras, Meteors, or Halos round the 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.

ADDITIONAL REMARKS.



SCOTTISH METEOROLOGICAL SOCIETY.

Observations taken at Dunfermline, County of Fife, During the MONTH of November 1908.

Lat. 55° 54', Long. 2° 46' 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 3.5 inches. Height of Rim of Gauge above Ground 12 inches

The Hours of Observation are of Greenwich Time.

Days of Month.	BAROMETER.				SELF-REGISTERING THERMOMETERS. Read Daily, at 3 P.M.				HYGROMETER.		RAIN.		WIND.				CLOUDS.				SUNSHINE. Hours.	THERMOMETERS under Ground.					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.		
	9 A.M.		9 P.M.		Protected in Screen, 4 feet above Ground.		Black Bulb Max. in Sun.	Min. on Grass.	9 A.M.		9 P.M.		9 A.M.		9 P.M.		9 A.M.		9 P.M.			9 A.M.								
	Barometer. No.	Attached Thermometer.	Barometer. No.	Attached Thermometer.	Max. No.	Min. No.			Dry bulb.	Wet bulb.	Dry bulb.	Wet bulb.	Amount at 9 A.M.	Direction.	Force. Scale of 0-12.	Direction.	Force. Scale of 0-12.	Ane- nometer. 9 A.M.	Species and Direction.	Amount (0-10).		Species and Direction.	Amount (0-10).	No. 3 ins.	No. 12 ins.	No. 22 ins.			No. 36 ins.	No. 48 ins.
1	30.150	52.0	30.175	56.0	55.2	33.6			37.0	36.5	43.0	42.0	0.00	S	1	S	1	Pir 3	large									Fair & very fine, heavy dew, large P.M.	1	
2	30.152	52.0	30.150	55.0	47.8	36.0			42.0	41.8	45.0	44.0	0.17	S	1	S	2	damp fog	rain.									Heavy damp fog, rain P.M.	2	
3	30.145	54.0	30.151	57.0	52.0	41.5			51.0	50.2	51.8	51.0	0.03	S	1	SE	1	n 10	n 10									Damp fog, fair, slight rain.	3	
4	30.165	54.0	30.200	52.0	51.0	47.2			49.0	48.0	49.0	48.0	0.02	SE	1	SE	1	ci 10	n 10									Slight frequent all day	4	
5	30.180	54.0	30.150	52.0	50.0	46.8			47.4	46.8	49.0	48.0	0.08	SW	1	NE	1	n 10	n 10									Rain, frequent all day.	5	
6	30.200	50.0	30.180	51.0	49.0	44.8			46.2	45.2	46.0	45.5	0.06	SE	1	SE	1	n 10	n 10									Dull, fair, slight rain.	6	
7	30.025	51.0	29.935	43.0	46.6	39.2			40.2	38.8	40.0	39.0	0.04	S	1	S	1	ci 5	fog.									Fair, mild all day some sunshine fog	7	
8	29.880	51.0	29.841	50.0	46.1	39.4			40.0	39.6	40.0	39.6	0.00	SW	1	SW	1	ci 6	ci 6									Fair & fine, mild all day.	8	
9	29.857	51.0	29.890	46.0	40.0	31.0			34.0	33.0	33.0	32.0	0.00	SW	1	SW	1	ci 4	ci 5									Fair, white frost cool & damp all day	9	
10	29.850	48.0	29.750	48.0	41.5	30.0			33.0	32.0	34.0	33.5	0.08	SW	1	SW	1	ci 6	ci 6									Do.	10	
11	29.700	47.0	29.575	53.0	52.0	35.8			42.5	40.6	43.0	40.0	0.23	SW	2	SW	2	ci 8	ci 10									Fresh & fair, been shower, rain P.M.	11	
12	29.650	50.0	29.855	53.0	51.2	41.0			42.2	41.4	43.0	41.0	0.18	SW	1	SW	1	ci 8	ci 8									Fair & fine, dull P.M.	12	
13	29.775	51.0	29.930	53.0	47.0	39.5			40.5	40.0	43.0	41.0	0.10	SW	1	SW	1	ci 4	ci 3									Fair & fine, heavy rain 3-5 A.M.	13	
14	29.950	49.0	30.145	52.0	47.0	34.0			39.8	39.0	43.0	43.0	0.09	W	1	NE	1	n 10	ci 8									Rain frequent all day, clear P.M.	14	
15	30.200	49.0	30.050	52.0	49.0	34.0			43.0	42.0	45.0	43.0	0.00	S	1	SW	4	ci 8	ci 8									Fair, mild breeze, dull.	15	
16	29.900	51.0	29.800	53.0	52.0	42.0			48.8	46.5	44.8	41.0	0.00	SW	6	SW	2	cu 8	ci 2									Fair, breeze all day.	16	
17	29.830	49.0	30.050	50.0	47.4	36.0			42.0	38.0	40.5	38.8	0.00	SW	6	W	2	ci 2	ci 2									Do.	17	
18	29.860	49.0	29.720	51.0	51.0	35.0			44.8	43.0	42.0	40.0	0.04	SW	2	W	4	ci 8	ci 8									Fair mild cool & clear P.M.	18	
19	29.900	48.0	30.075	48.0	46.5	34.5			39.0	37.0	36.0	34.0	0.06	W	4	W	4	cu 4	cu 8									Cool, stormy showers frequent.	19	
20	29.900	45.0	29.675	41.0	45.0	29.8			34.5	32.0	35.0	33.5	0.11	SW	2	W	6	ci 8	ci 4									Dull, cool, showers from noon	20	
21	29.800	44.0	29.400	44.0	47.2	32.5			35.5	34.2	45.0	44.0	0.23	SW	2	W	4	ci 8	cu 8									Dull, mild, rain from 4 P.M.	21	
22	29.050	49.0	28.825	47.0	49.0	34.8			48.4	43.0	38.0	36.0	0.06	W	6	W	4	ci 5	ci 6									Fair & fine all day dull P.M.	22	
23	29.700	47.0	30.000	48.0	49.0	34.2			49.0	47.0	47.5	46.0	0.00	W	6	W	2	ci 4	ci 5									Slight showers, milder later.	23	
24	29.720	48.0	29.475	52.0	53.7	32.5			49.0	47.0	47.0	45.0	0.00	SW	4	SW	8	cu 10	ci 8									Dull, fair, strong breeze noon.	24	
25	29.425	44.0	29.470	48.0	44.2	36.0			38.0	36.0	40.0	39.0	0.01	SW	6	SW	2	ci 4	ci 8									Fair, drying breeze, clear P.M.	25	
26	29.725	46.0	30.000	48.0	45.2	36.8			41.5	40.4	43.0	42.0	0.00	W	8	W	2	ci 8	ci 8									Do.	26	
27	29.900	47.0	29.800	52.0	51.0	33.0			45.6	44.6	47.0	46.0	0.02	S	2	S	2	ci 4	ci 10									Fair & fine dull all day.	27	
28	29.650	50.0	29.750	53.0	52.0	44.8			50.2	48.0	46.5	44.0	0.05	S	6	S	2	cu 10	cu 10									Dull rain forenoon, fair, mild P.M.	28	
29	30.050	49.0	30.150	57.0	49.6	38.6			41.0	39.0	47.0	45.0	0.00	SW	2	W	2	ci 6	ci 9									Fair, mild, & very fine dull P.M.	29	
30	30.255	50.0	30.375	51.0	51.0	39.5			42.0	40.0	46.0	45.0	0.00	W	1	SW	1	ci 4	ci 9									Do.	30	
31																													Do.	31
Sums.	16103	13	13135	11	135	1510			137	146	143	132	8					189	76											
Means.	29.885	49.3	29.883	50.5	48.8	7.3			42.6	41.0	43.1	41.9	✓	2.6		2.2		63	5.9											
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.			
h.	hail.			
l.	lightning.			
lu. co.	lunar corona.			
lu. ha.	lunar halo.			
m.	mist.			
p.	passing showers.			
r.	rain.			
r.	heavy rain.			
sl.	sleet.			
sn.	snow.			
so. ha.	solar halo.			
q.	squall.			
q.	violent squalls.			
t.	thunder.			
t. s.	thunder-storm.			

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

BAROMETER. Corrected Mean at 9 A.M., minus Correction for Temp. = 29.830
 Corrected Mean at 9 P.M., minus Correction for Temp. = 29.824
 Mean at Station, corrected, and at 32°, = 29.827
 Correction for height, feet above Mean Sea-level, = + 50
 Mean, reduced to 32°, and Sea-level, = 29.77
 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 1 th, = 55
 Lowest in Month, corrected for Index errors, on the 10 th, 2.0. = 30
 Difference, or Monthly Range, = 25
 Mean of all the Highest, = 48.8
 Mean of all the Lowest, = 37.3
 Difference, or Mean Daily Range, = 11.5
 Mean Temperature of Month, $\frac{1}{2}$ (Mean Max. + Mean Min.), = 43.1
 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, = 43.0
 Wet Bulb, Mean of A.M. and P.M. Readings, = 41.5
 Computed Temperature of Dew-Point, =
 Do. Elastic Force of Vapour, = 245
 Do. Relative Humidity (Saturation = 100), = 88
 RAIN fell on 19 Days; Amount in Inches, = 1.66

WIND.		SUMMARY.									
Direction.	N	NE	E	SE	S	SW	W	NW	Calm or Variable.	Mean Force 0-12.	
A.M.					2	7	15	4	2	2.6	
P.M.		2		3	5	11	6	3		2.2	
Sun.	0	2	0	5	12	26	10	5	0	2.4	

Observations made and Return verified by Peter J. 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. Mercuial 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 1/1000 inch, 0.100 inch, and 0.000 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 written down, should be compared again with the scale.

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.	FRUIT.	First in Blossom generally.	First in Blossom.	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,			Starlings,		
Lilac,		Plum,			Swan,		
Mezereum,		Strawberry,			Rail or Corn Crane,		
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.

METEOROLOGICAL OBSERVATIONS.

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 amounts 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 notebook 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.

ADDITIONAL REMARKS.

BOOK POST.

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 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 sun or moon; of all Auroras, Meteors, or Halos round the 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.

SCOTTISH METEOROLOGICAL SOCIETY.

Observations taken at Buttin Park Aberdeen, County of Aberdeen, During the MONTH of December 1908

Lat. 37.8 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.				SELF-REGISTERING THERMOMETERS, Read Daily, at 9 P.M.				HYGROMETER.		RAIN.		WIND.				CLOUDS.				SUNSHINE. Hours.	THERMOMETERS under Ground.					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.		
	9 A.M.		9 P.M.		Protected in Screen, 4 feet above Ground.	Black Bulb Max. in Sun.	Min. on Grass.	9 A.M.		9 P.M.		Amount at 9 A.M.	9 A.M.		9 P.M.		Anemometer, 9 A.M.	9 A.M.		9 P.M.		9 A.M.								
	Barometer. No.	Attached Thermometer.	Barometer. No.	Attached Thermometer.				Dry bulb.	Wet bulb.	Dry bulb.	Wet bulb.		Direction.	Force. Scale of 0-12.	Direction.	Force. Scale of 0-12.		Species and Direction.	Amount (0-10).	Species and Direction.		Amount (0-10).	No. 8 ins.	No. 12 ins.	No. 22 ins.	No. 36 ins.			No. 48 ins.	
inches.		inches.		°		°		inches.		inches.		inches.		inches.		inches.		inches.		inches.		inches.		inches.						
1	30.310	46.	30.300	48	48.6	31.4			35.0	34.0	33.2	32.0	0.00	SW	2	SW	1	Ci	6	-	0							Slight frost fair & fine, clear P.M.	1	
2	30.250	47.	30.275	51.	46.5	31.2			39.0	38.0	36.0	35.0	0.00	S.W.	2	S.W.	1	cu	6	ci	6							Fair, very fine & mild all day	2	
3	30.250	49.	30.245	52.	47.0	37.8			42.0	41.0	41.0	40.0	0.00	S.W.	2	S.W.	2	ci	6	cu	8							Do Do. Dull P.M.	3	
4	30.160	49.	30.110	52.	44.0	38.8			42.0	41.0	42.0	41.0	0.00	S.W.	2	S.W.	2	ci	8	ci	6							Dull, fair mild all day.	4	
5	29.960	48.	29.925	54.	50.6	30.8			46.8	45.8	50.0	48.6	0.03	S.W.	2	S.W.	6	ci	8	ci	8							Do Do	5	
6	29.800	47.	29.950	51.	44.0	33.7			40.0	37.7	35.0	34.0	0.03	S.W.	2	S.W.	2	ci	3	ci	6							Fair, mild, very fine & light fluffy clouds	6	
7	29.900	44.	29.600	51.	50.0	28.2			36.0	32.0	40.0	38.5	0.00	S.W.	2	S.W.	6	ci	6	cu	5							Fair white frost stormy cold winds.	7	
8	29.375	50.	29.400	52.	49.0	35.0			48.0	46.4	39.0	36.5	0.01	W	2	S.W.	2	ci	8	ci	4							Some rain, fine all day, clear P.M.	8	
9	29.380	46.	29.225	44.	41.2	36.0			37.0	35.0	40.0	38.0	0.00	S.W.	4	S	4	ci	2	ci	8							Fair & fine cold & dry all day	9	
10	29.030	45.	28.653	47.	42.0	35.0			27.0	35.7	38.0	37.5	0.27	S.W.	1	S.W.	2	ci	8	n	10							Fair mild & fine rain from 3 P.M.	10	
11	28.740	46.	29.140	44.	42.1	36.0			39.5	37.0	37.5	37.0	0.64	W	4	W	6	n	10	n	10							Beer very stormy night rain P.M.	11	
12	29.410	44.	29.500	47.	42.4	31.0			40.0	38.0	30.0	29.0	0.12	W	4	W	2	ci	6	-	-							Fair & fine all day clear frost P.M.	12	
13	29.200	43.	29.300	48.	41.0	29.0			38.2	38.0	36.5	36.0	0.00	S.W.	2	S.W.	2	ci	8	-	0							Beer heavy rain, fair & fine from 8 A.M.	13	
14	29.375	45.	29.150	46.	45.5	31.2			37.8	36.0	38.5	38.0	0.20	S.W.	2	S.W.	1	ci	5	ci	6							Fair, white frost, slight rain after.	14	
15	29.075	46.	29.300	49.	45.6	32.4			39.0	38.5	36.0	35.0	0.00	S	1	S	1	fog	10	-	0							Fair, fog, clearing & fine afternoon.	15	
16	29.470	43.	29.305	46.	47.0	29.0			30.0	30.0	36.0	34.0	0.00	S.W.	1	S.W.	1		0	ci	6							Mild white frost, fine all day	16	
17	29.200	49.	29.250	50.	47.4	30.0			47.6	45.2	46.0	45.0	0.00	S.	4	S	2	ci	6	-	0							Fair mild, fine all day, clear all evening	17	
18	29.350	45.	29.675	50.	47.4	34.0			46.8	45.8	38.0	36.0	0.00	S.W.	1	S.W.	2	ci	2	-	0							Fair, slight frost, mild all day	18	
19	29.900	44.	29.950	47.	47.0	29.9			30.8	29.3	38.0	37.0	0.06	S.W.	1	S.W.	2		0	cu	8							Fair, frost slight rain afternoon.	19	
20	29.900	48.	30.100	49.	51.4	45.0			47.0	46.5	48.0	47.0	0.00	S.W.	2	S.W.	1	n	10	-	0							Dull fair mild & very fine afternoon	20	
21	30.100	47.	30.050	49.	51.0	31.9			41.0	40.2	44.0	42.0	0.00	S.W.	2	S.W.	1	ci	2	-	0							Fair & fine, mild all day, clear P.M.	21	
22	30.050	50.	29.905	52.	50.0	31.0			49.0	47.4	46.0	44.0	0.01	S.W.	2	S	4	ci	8	n	10							Do Do. Dull slight rain, P.M.	22	
23	30.150	50.	30.110	52.	47.0	42.0			43.0	41.0	45.0	43.5	0.02	W	2	W	1	ci	5	cu	10							Do Do	23	
24	30.050	50.	30.050	52.	44.0	40.6			44.0	41.6	43.0	40.0	0.00	S	4	S	4	cu	10	cu	10							Fair, brassy, dying wind all day.	24	
25	30.125	50.	30.150	53.	43.0	40.2			42.0	39.0	41.0	39.0	0.00	S	2	S	1	ci	10	cu	10							Fair & fine, dull all day.	25	
26	30.175	50.	30.160	49.	43.0	41.0			43.6	40.0	42.0	40.0	0.20	S.E.	4	S.E.	4	cu	10	n	10							Fair, gloomy, cold, some rain afternoon & evening	26	
27	30.005	43	29.950	38.	43.0	31.4			32.8	31.4	34.0	33.0	1.33	S.E.	4	S	4	n	10	n	4							Stormy snow showers continuing.	27	
28	29.950	37.	29.800	38.	42.0	26.6			28.0	27.0	28.0	26.0	1.50	S	6	S	8	n	10	n	10							Very heavy snow storm	28	
29	29.650	40.	29.830	42.	31.0	26.6			30.4	30.0	30.0	29.0	0.59	S.E.	8	S.W.	4	n	10	ci	8							Constant snow, fair from 5 P.M.	29	
30	30.055	40	30.025	42.	39.2	23.6			31.0	30.0	36.9	36.8	0.58	S	4	S	6	ci	8	cu	10							Fair turning fresh 5 P.M.	30	
31	30.000	42	30.250	46.	41.4	30.6			39.8	38.8	38.5	37.0	0.00	S.W.	4	S.W.	2	ci	6	ci	6							Fair & fresh snow melting, frost P.M.	31	
Sums.	1113	13	1294	14	125	29			156	147	143	162	24					85												
Means.	29.753	45.9	29.756	48.3	45.0	33.2			29.6	28.0	38.9	37.6						27												
Corrections for Instrumental Errors.																														
Corrections for Diurnal Range.																														
Corrected Means																														

NOTATION USED IN GENERAL REMARKS.

a. denotes aurora.

d. drizzling rain.

f. fog.

f.r. 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. heavy rain.

sl. sleet.

sn. snow.

so. ha. solar halo.

s. squall.

v. 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.

Camulo-cirrus. cum-cir.

LOWER CLOUDS.

Strato-cumulus. str-cum.

Cumulus. cum.

Camulo-nimbus. cum-nim.

Nimbus. nim.

Stratus. str.

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

FORCE.

0 Calm.

1 Light Air.

2 Light Breeze.

3 Gentle Breeze.

4 Moderate Breeze.

FORCE.

5 Fresh Breeze.

6 Strong Breeze.

7 Moderate Gale.

8 Fresh Gale.

FORCE.

9 Strong Gale.

10 Whole Gale.

11 Storm.

12 Hurricane.

BAROMETER. Corrected Mean at 9 A.M., *minus* Correction for } = 29.707
Temp. = - 46 }

Corrected Mean at 9 P.M., *minus* Correction for } = 703
Temp. = 53. }

Mean at Station, corrected, and at 32°,..... = 29 705

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

Mean, reduced to 32°, and Sea-level, = 755

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, 20.21.....

Lowest in Month, corrected for Index errors, on the 30th, = 24

Difference, or **Monthly Range**, = 27

Mean of all the Highest, = 450.0

Mean of all the Lowest, = 33.2

Difference, or Mean Daily Range, = 77.8

Mean Temperature of Month, $\frac{1}{2}$ (Mean Max. + Mean Min.), = 50.1

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, = 39.2

Wet Bulb, Mean of A.M. and P.M. Readings, = 37.8

Computed Temperature of Dew-Point. =

Do. Elastic Force of Vapour, = 212

Do. **Relative Humidity** (Saturation = 100), = 88

RAIN fell on 15th Days; Amount in Inches, = 5.19

WIND.		SUMMARY.								Calm or Variable.	Mean Force 0-12.
Direction.	N	NE	E	SE	S	SW	W	NW			
A.M.	1			3	6	18	1	2			
P.M.				1	9	18	2	1			
Sun.	1	0	0	4	15	36	3	3	0	28	

Observations made and
Return verified by } Peter Barker

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

(Signed) _____

INSTRUCTIONS

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. Mercutrial barometers mounted in metal cases are the only sort suitable for the accurate measurement of atmospheric pressure.

FORTH 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 1-1000 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 written down, should be compared again with the scale.

DATES IN CONNECTION WITH THE PERIODICAL RETURN OF THE SEASONS.

FOREST TREES.	In Flower.	Leaf Buds first-Appear.	In Leaf.	Divested of Leaves.	CROPS maturing early.	Swing or Ploughing.	Appearing above Ground.	In Ear or Flower.	First Out.
Alder,					Barley,				First Out.
Ash,					Bere or Bigg,				First Out.
Beech,					Oats,				First Out.
Birch,					Wheat,				First Out.
Elm,					Beans,				First Out.
Larch,					Pease,				First Out.
Lime,					Potatoes,				First Out.
Oak,					Turnips,				First Out.
Sycamore or Plane,					Rye Grass,				First Out.

SHRUBS, ETC.	First in Blossom.	FRUIT.	First in Blossom.	FRUIT Ripe generally.	MIGRATORY BIRDS.	First Arrival.	Departure.
Barberry,		Apple,			Cuckoo,		
Bourtree or Elder,		Black Currant,			Curtlew,		
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 Crane,		
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.

FOR TAKING METEOROLOGICAL OBSERVATIONS.

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 notebook or other convenient place before the glass is emptied. Thus after heavy rain the amounts measured might be:—

1-27
47
49
38

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.

ADDITIONAL REMARKS.

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 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 sunshining 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 sun or moon; of all Auroras, Meteors, or Halos round the sun or moon; of 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.