

OLOGICAL SOCIETY.

, in Lat. \_\_\_\_\_, Long. \_\_\_\_\_, Distance from Sea \_\_\_\_\_ miles.

feet. During the MONTH of \_\_\_\_\_ 18\_\_\_\_.

are of Greenwich Time.

Weather Observations for May 1867

Days of Month.	Bar.	Therm.	Wind.	Clouds.	Remarks.
1	60	44	30.00	0.3	Overcast Showers a.m., fine P.M., but clear
2	61	44	16	SE 0	Heavy & gloomy a.m. same P.M. but overcast
3	68	47	24	SE 0	fine
4	69	46	23	SE 0	" "
5	72	45	17	SE	" "
6	82	49	04	SE, E	" "
7	81	59	10	SE	" "
8	80	61	05	SE	" "
9	71	53	08	SE	much cloud but lightning
10	78	53	29.94	showers	heavy showers " thunder lightning & rain
11	67	55	20	SE	3 to 5.30 a.m. Thunder storm Wind but clear
12	58	49	20	E	fine till 8 a.m., then rain & wind
13	52	45	16	NE	Overcast, Windy, Cold
14	53	44	16	ENE	Cloudy Cold but overcast
15	52	42	15	"	Overcast Wind but light rain
16	52	41	11	NNE	" Cold 10.45. Rain, Showers but overcast
17	55	40	20	ESE	fine, much cloud but clear
18	63	38	18	ESE	fine
19	69	44	29.95	"	Heavy Clouds
20	65	51	24	NNE	Overcast 8.30 a.m. light Showers, 12.40 P.M. rain
21	50	48	20	N	Rain all night, continued rain till 5 P.M. but overcast
22	50	35	20.04	NNE	fine till 9.50 a.m. Hail Snow & rain squalls but clear
23	52	32	19	NNE	High Wind Drifting & cold but clear
24	51	33	23	NE	Overcast but light haze
25	57	34	22	E	Cloudy but Wind but 11.30 P.M. rain Showers Wind
26	66	46	29.94	SE	Rain & fog but clear with rain
27	66	57	20	SE	Showers early, 7 to 10 a.m. Showers, 4.30 P.M. Showers, but clear
28	68	48	20	SE	Light Showers, a.m. Cloudy P.M. but same
29	72	53	30.06	SE	Sky mist Overcast a.m., 1.30 P.M. Showers but clear
30	71	55	20.18	SE	Overcast light Showers & showers but clear
31	71	50	22	NW	" & hail all day but clear

London 17 June 1867

Geo. Thompson CE

999

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

S.-R. THERMOMETER, (in shade, etc.), Highest in Month, (corrected for Index Errors), on the th, =  
Lowest in Month, corrected for Index errors, on the th, =  
Difference, or Monthly Range, =  
"Corrected Mean" of all the Highest, (Col. 5), =  
"Corrected Mean" of all the Lowest, (Col. 6), =  
Difference, or Mean Daily Range, =  
\*\* Calculated Mean Temperature of Month, =

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

HYGROMETER, Mean (corrected) A.M. and P.M. Reading of Dry Bulb, (Cols. 9 and 11), =  
Mean (corrected) A.M. and P.M. Reading of Wet Bulb, (Cols. 10 and 12), =

# Computed Temperature of Dew-Point, =  
# Do. Elastic Force of Vapour, =  
# Do. Weight of Vapour in a Cubic Foot of Air, =  
# Relative Humidity, (Saturation = 100), =

RAIN fell on Days; Amount in Inches, =

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

\* Each instrument tested at the Office in Edinburgh bears the stamp "S.M.S.," and a number to be entered in the Heading; or the Number and Initials of the Maker may be here given.  
+ Embracing corrections for both capillarity and Index Errors.  
+ The Thermal Range for Scotland is as yet unknown.  
+ Practically, though not absolutely a minus correction.  
+ These "Hygrometric Deductions" are calculated from Glashier's Hygrometric Tables, Second Edition only.  
+ While the Thermal Range is unknown, the Arithmetic Mean of Cols. 9 and 10 will be entered as the "Calculated Mean Temperature."  
+ Any Observations not taken under the conditions specified in the Directions on the other side, or noted at the Top of each column, must be marked as such by the observer, in each Schedule. See over.

N.B.—The Sums to be correctly added, and the Means deduced. Returns from the "Principal Towns" should be in Edinburgh not later than the 3rd; those from Other Places, not later if possible than the 6th. This Schedule not to be Gummed or Fastened, and Forwarded by Book Post, prepaid.

Observations made and Return verified by

(Signed)

62  
25  
37

999



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

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

**Hour of Observation.**—The Council recommend that Observations be made precisely at 9 o'clock (Greenwich or Railway Time) twice a-day for some time, and once (naming or evening) for other instruments, as specified in the following remarks; or at the top of the solenitude. It is hoped that the utmost punctuality in the time of reading the instruments will be observed. Observers, in some few cases, may find this impossible; in such instances, they are specially requested to mark opposite every reading at what time it was taken, if not at 9 o'clock.

**Barometer.**—*Weather glasses* and *Aneroids*, though admirably adapted, as the latter certainly are, to indicate variations of atmospheric pressure, are not well fitted for scientific purposes. Nor can any Barometer be used for Meteorological Observations that is not supplied with such means of *adjustment* or *compensation* as will secure the height of the mercury in the tube being accurately measured from the fluctuating surface of the mercury in the cistern. It is also necessary that every Barometer shall have been compared with a *Standard*.

Two moderate-priced Barometers have been approved of by the Council; if properly tested and attended to, they are both well adapted to Meteorological purposes.

An excellent Barometer, constructed by Mr. Adie of London, requiring *no adjustment* of the cistern. Its *scale-inches* are not true inches but so much shorter as to *compensate* the error that would otherwise arise from the fluctuations of the surface of mercury in the cistern. This form of instrument has been adopted by the Board of Trade, and has received the approval of the Meteorological Committee of the British Association. In another form of the Barometer, the sides of the *cistern* are of leather, and thus, by aid of a screw acting on the bottom, the surface of the contained mercury can be adjusted to the *zero-point* of the fixed scale; their coincidence being indicated by a little ivory float, whose stem passes freely through the lid and case of the cistern. When *screw, to form one straight line* with those on its ivory frame, the surface of the mercury, is then at the exact height from which the *scale* is graduated. In taking an observation, this *preliminary* setting must be made with scrupulous accuracy; as a slight error here will vitiate the readings from the *venier*.

When a Barometer having adjustable surfaces has to be removed from its fastenings the ivory peg must be screwed so as to form a tight plug to the cistern. Then *serve* up the mercury to within a quarter of an inch of the top of the tube, and take down the instrument; it may then be carried with the cistern uppermost. Before suspending the Barometer for use, it must be ascertained whether the space above the mercury in the tube is a complete vacuum; this is the case when, on inclining the instrument so that the mercury strikes the top of the tube, a *sharp tap* is produced. If this is prevented by air it may be removed to the cistern, and got rid of, by inverting the Barometer (care being taken to prevent the loss of mercury by tightening the ivory peg), and gently tapping it; and if this plan fails, the instrument must be repaired.

The Barometer should be suspended in a good *light*, which may be improved by putting a piece of white paper behind the tube. It must be perfectly perpendicular; and exposed to neither the sun's direct rays nor the heat of a fire.

In *taking an Observation*, the attached Thermometer is first noted; the tube must then be gently tapped and the cistern-adjustment carefully made. By raising and lowering the eye, it must be brought into the plane of the back and front of the index; namely the lower edge of the *venier*, which must be carefully adjusted to form exactly a tangent to the convex surface of the mercury in the tube. Observations must be taken quickly; so as to prevent heat from the observer's hands and person from affecting the mercury. The use of a lens will greatly facilitate an accurate adjustment and reading of the Barometer.

**Protection of Thermometers.**—The Council of the Society recommend that Self-registering Thermometers and Hygrometers be enclosed in a Box, painted white outside, and black within, and fixed 4 feet above grass in an exposed position, free from merely local influences. The laths forming the sides and doors of the Boxes are arranged so as at once to "protect" the Thermometers, and to allow a complete ventilation of the interior. The instruments are suspended on cross-laths, in the centre of the Box, and face the door opening to the north. To accommodate a duplicate set of instruments, which is most desirable, doors are also made to open to the south. These Boxes may be had at the Society's Office.

**Self-registering Thermometers.**—Professor Phillips's, and Negretti and Zamboni's Patent "*Maximum*" Thermometers are recommended; printed directions for their use may be obtained with each instrument. The "*Minimum*" Thermometer of Rutherford is recommended when graduated on the glass stem and affixed to a frame separate from the "*Maximum*." This Thermometer is liable to two derangements, both of which must be guarded against, and may be easily remedied by an observer. When the *columns* of spirit breaks, it may be re-united by striking the instrument repeatedly against the palm of the hand; when part of the spirit distils by high temperature, it will be found in the upper lobe, and must be dislodged from thence by heating that part over a lamp; the alcohol will evaporate and again condense in contact with the body of the liquid. These instruments should be hung horizontally.

The above remarks apply equally to the Thermometers for

registering the greatest heat from the sun's rays, and the least from radiation during night. Their bulbs have a black coating, which may easily be made, or mended, by the application of a mixture of lamp black and printer's ink. They are placed in shallow blackened boxes, whose sides protect the bulbs from the wind. The "*Maximum*" should rest on wooden supports a few inches from the surface of the grass, in an open situation. Snow must not be allowed to cover either of these Thermometers; nor the sun's heat to affect the Minimum Thermometer by dissipation.

**Verification of Thermometers.**—No instrument ought to be used for Meteorological purposes till it has been carefully tested by comparison with a *Standard Thermometer*. When such Thermometers are not graduated on the stem, but merely on an attached scale, undergo repairs, they are very liable to be moved from their position on the Scale, and ought never afterwards to be used, without being *re-tested*. The self-registering, and especially the "*Minimum*" Thermometers, ought frequently to be compared with the dry bulb of the Hygrometer. The freezing-point of each Thermometer (marked by a scratch on the tube) ought to be tested once a year, in snow or melting ice. For comparison of Thermometers, a properly tested Thermometer may be had, on loan, by any observer, from the Meteorological Secretary.

The *Hygrometer* consists of two Thermometers usually, but not necessarily, mounted on one frame. As apparently slight deviations from the approved and *well-tested form* of this apparatus specially vitiate the "Hygrometrical Deductions," Observers are respectfully requested to attend to the following conditions:—The bulbs must *hang down* by at least an inch free from the scales and frame to which they are attached;—the frame must be such as will bring the tubes forward by an inch, from any board on which it may be suspended; the water-cup must be covered, and placed to the side, and a little below the level of the wet bulb;—in no case under the bulbs;—the muslin must be of medium fineness, and fastened at the neck of the bulb by the cotton, which also supplies it with water. It must be seen by the observer that the muslin is always *clean* and *moist*, and the water pure. In frosty weather observation is a matter of much delicacy, and must be made with great care. The bulb must be moistened by immersion from 15 to 30 minutes before the hour of observation. From the film of ice thus formed evaporation will proceed as from the moist cloth in ordinary circumstances. One form of "Mason's" Hygrometer is highly objectionable. The frame of the Thermometers is enclosed in a tin case, which also supports the water-cup underneath. This arrangement must be immediately altered by pulling the boxwood frame out of the tin case, and hanging them side by side, so that the forementioned requirements shall be complied with, as far as possible.

**Reading of the Thermometer.**—Great care must be taken to avoid the effects of refraction, by bringing the eye exactly opposite the tip of the index or *column* of mercury. The reading ought to be taken to tenths of a degree, and noted in decimals. Thus the Thermometer will be read—39°.9, 40°.0, or 40°.1; or again, 40°.4, 40°.5, or 40°.6, according as it indicates a little under, an exact coincidence with, or a little over 40°, or 40½°, respectively. So also 40½° and 40° 3' or 40° 8' respectively. In reading Rutherford's "*Max*" and "*Min*," Thermometers, the indication of that end of the *index* which is next to the surface of the mercury or alcohol is alone noted. Readings of the Thermometers, especially of the wet and dry *bulbs*, must be rapidly taken, being so readily affected by heat from the person of the observer.

**Hour of observing Temperature.**—The Hygrometer is read at 9 a.m. and 9 p.m. The self-registering Thermometers are read at 9 p.m. only, as indicating the greatest and least degrees of temperature in the 24 hours preceding. It is not a matter of indifference when the self-registering Thermometers are read, in winter at least, the extremes may occur at any hour; and it is necessary to refer their occurrence to their proper meteorological *date*. In the Society's schedules, the indications registered at the 3rd are those of a series of phenomena commencing at 9 p.m. on the 2nd, and extending till 9 p.m. on the 3rd.

**Wind.**—A wind-vane ought to be elevated 12 feet at least above surrounding objects. When it oscillates incessantly, the mean direction must be taken; and when it is stationary, the direction of the wind is fickle, reference must be made to the direction of snaks, etc. Careful observations ought to be made on the changes in the direction of the wind; and during storms, extra observations ought to be made at every hour of Greenwich time. Such a system of simultaneous observation, pursued at different Stations, would be likely to give highly interesting and important results.

The Council would strongly recommend that every observatory be furnished with a Hemispherical-Cup Anemometer, a self-registering instrument which shows the amount of Wind that passes it per day; from which also the Velocity of the Wind at the time of observation may be ascertained. For indicating the Force of the Wind, at any particular hour of observation, Lind's Anemometer is also recommended; the method of *Estimating Wind Force* by such tables, is, to say the least, unsatisfactory.

**Rain-gauges.**—Many causes conspire to produce anomalies in rain returns. They arise, partly from unfavourable situation for observation and partly from the defective nature of the instruments used. It is, indeed, difficult to obtain an unexceptionable position for the rain-gauge; but in all cases the gauge must be sunk in the ground till its edges are on a level with the close cut grass around its mouth. The rain-gauge ought to be read daily, and the readings entered in the returns on the day on which the rain fell.

**Snow-falls may, for convenience,** be registered in the rain columns, under the following conditions:—when a Snow shower occurs it must be noted in the "Remarks," and the letter S affixed to the depth of water received in gauge. The depth of the snow must be measured in some open place where no drift is observed, and registered in addition to, and as a check upon, the indications of the rain-gauge. For wind, rain, and snow, as indeed in every column, the observer cannot be too careful to register *observations* only; and nothing that partakes of the nature of deduction or inference.

**Clouds.**—Convenient abbreviations for Luke Howard's

nomenclature of clouds will be found on the other side. The amount of cloud in the atmosphere ought to be estimated from the greater or less obscuration of the sky *overhead* (i. e., within 20° or 30° of the zenith). The strata of clouds that appear near the horizon are viewed obliquely; and thus, being unable to judge of their amount, we ought not to take them into account in the *clouds' column*, though their appearances and changes ought to be noted among the "*Remarks*." The amount of cloud is entered from a scale of 0 to 10; thus, when the sky *overhead* is *half covered* by clouds, 5 is entered as the *observation*, and so on.

Observations of the clouds are made at 9 a.m. and at sunset,

as illustrating the condition and currents of the upper and lower

regions of the atmosphere. The entries in the schedule are to

be made in the following manner;—In the column "Velocity

and Direction," \_\_\_\_\_ (for example,) will indicate that the

upper strata of clouds travel with *extreme* velocity from S.W.,

and those in the lower regions from W., with one-third the

(*extreme*) speed of the former. Again, in the second "Cloud"

column, an entry of \_\_\_\_\_ (e.g.) will indicate that the higher

regions are covered to the "amount" of 4-tenths with *stratus*

clouds; and that the sky is further obscured to the extent of

2-tenths by lower clouds of the *cumulo-stratus* kind.

**Shade.**—The number of hours in which objects in the sun's

rays cast shadows, should be entered in the proper column.

**Underground Thermometers.**—As the germination and health

of crops and plants greatly depend on the temperature of the

soil,—its amount and constancy,—the Council recommend that

observations in this interesting department be made at 9 a.m., by

thermometers placed in the earth, their bulbs being sunk to 3,

12, and 22 inches, and the stems above ground protected from

the sun's rays, and fitted with sloping tin collars, to prevent rain-

water being conveyed to the bulbs by the stems or wooden frames.

Mention must be made of the geological formation and agricultural

condition of the soil in which these Thermometers are

placed.

**Temperature of the Sea.**—A knowledge of the temperature of

the sea is not only in itself, but in its relations to that of our

island, a very important branch of Meteorology. The Council,

therefore recommend that the temperature of the sea be carefully

taken by a properly constructed apparatus, from the ends

of piers and rocks round the coast, where it is not influenced by

that of river water. At or near the time of high water, on the

5th, 15th, and 25th of each month, the thermometer ought to be

sunk exactly six feet (one fathom), and after ten minutes have

elapsed, drawn up and read. When convenient, extra sea observations

might be taken for other and greater depths, noting always

the temperature of the air, and the hour of observation; and continuing

to observe for particular depths.

**Temperature of Wells.**—The temperature of the water at the

bottoms of wells ought, when practicable, to be taken, and the

depth of the wells and of the water noted.

**Ozone.**—Mention whether Schönbein's or Moffat's papers are

used. The paper is affixed by a pin to a board in the thermometer

box, and the indications registered at 9 a.m. and 9 p.m.

It is desired that these indications be registered in connection

with the force and direction of the wind at the time of observation,

in the following manner:—thus 3½°, as an *ozone* entry in

the schedule, will indicate that the *ozone* paper is tinted as "3"

on the scale, that the tint is from the N.W., and that its force

on the scale 0—6 is "4"; i.e., that it is *blowing fresh*.

**Electricity.**—Too much importance cannot be attached to

electric condition of the atmosphere in connection with terrestrial

magnetism, and as a meteorological phenomenon. A proper

Electrometer is necessary to every complete meteorological

observatory.

**Remarks.**—The "Remarks" column is too narrow, but unavoidably

so. Some of the most valuable observations that can be taken

are those for which no rules can be given nor hours assigned.

The use of contractions ought, therefore, to be taken every advantage

of, and a list of such as are recognised and in use at Greenwich

and Southampton, are given at the foot of the column.

Besides special and extraordinary observations, great prominence

ought to be given in this column to prevalent diseases, differences

in character, colour, velocity, and direction between the lower

and upper strata of clouds the colour of the sky, etc. Remarks

ought to be made on the occurrence of mists, aurora borealis,

remarkable depressions and elevations of the barometer, thunder,

storms, and remarkable falls of snow, hail, or rain, the hour of

onsets of wind attaining their maximum, as well as such notes

on storms as have been hinted at above. When lofty hills are

in the vicinity of an Observatory, the height of clouds and of the

snow-line in winter ought to be recorded.

By the use of abbreviations, the state of the weather at 9 a.m.

and 9 p.m. ought to be registered, either in two columns, otherwise

unoccupied, or in two ruled off for the purpose, from that

headed "Remarks." It is intended that observations by the

Electrometer should be entered in this manner on the side-

margin. Additional remarks may be made on the margin.

"*Observations* in connection with the periodic return of the

seasons" possess not only great scientific value, but are of considerable

interest to the Agriculturist. The Council would direct

the special attention of Observers to the registration of such

phenomena, that the published Summaries may fairly represent

the whole of Scotland. Observation ought to be confined to

individual trees and shrubs; to particular species of birds, and

in the case of crops, to specified sorts reared from year to year

on a selected piece of ground or farm.

The Council recommend that *tern day* observations be taken;

—viz., on the 21st days of March, June, September, and December.

Full directions for the use of the instruments mentioned

above have been printed, and may be had along with them from

the makers.

The Council have agreed to recommend that observers, before

purchasing new instruments, should communicate with the

Meteorological Secretary; and they consider it desirable that he

should have full power to reject any instrument which, on being

presented for comparison, does not afford him satisfaction.

(By Order) A. B.

EDINBURGH, 9th December 1865.

OBSERVATIONS IN CONNECTION WITH THE PERIODICAL RETURN OF THE SEASONS.

FOREST TREES.	GROUPS	SWAYING or Shaking or Above Ground.	In Ear or Below Cut
Alder, . . . . .	Beech, . . . . .	Beam, . . . . .	Wheat, . . . . .
Elm, . . . . .	Birch, . . . . .	Beam, . . . . .	Wheat, . . . . .
Maple, . . . . .	Birch, . . . . .	Beam, . . . . .	Wheat, . . . . .
Oak, . . . . .	Birch, . . . . .	Beam, . . . . .	Wheat, . . . . .
Sycamore or Plane, . . . . .	Birch, . . . . .	Beam, . . . . .	Wheat, . . . . .

SHRUBS, ETC.	First in Blossom.	First in Blossom.	First in Blossom.
Barberry, . . . . .	Apple, . . . . .	Black Currant, . . . . .	Cherry, . . . . .
Broom, . . . . .	Hazel, . . . . .	Hawthorn, . . . . .	Holly, . . . . .
Laburnum, . . . . .	Plum, . . . . .	Strawberry, . . . . .	Willow, . . . . .
Red Flowering Currant, . . . . .	Mountain Ash or Rowan, . . . . .	Rhododendron Ponticum, . . . . .	Willow, . . . . .

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

Mr. ALEXANDER BUCHAN,

Secretary of the Meteorological Society of Scotland,

EDINBURGH.

BOOK-POST.

To

Indm  
May 1867



SCOTTISH METEOROLOGICAL SOCIETY.

Observations taken at \_\_\_\_\_, County of \_\_\_\_\_, in Lat. \_\_\_\_\_, Long. \_\_\_\_\_, Distance from Sea \_\_\_\_\_ miles.

Height of Cistern of the Barometer above Mean Sea-level \_\_\_\_\_ feet, above Ground \_\_\_\_\_ feet. During the MONTH of \_\_\_\_\_

The Hours of Observation \_\_\_\_\_

*Sphenocera* for August 1867 Taken in London

[illegible]

<b>BAROMETER,</b> "corrected Mean" at 9 A.M., <i>minus</i> the Correction $\pm\pm$		=
for Temp. (Col. 2),	= .....	- .....
<b>"Corrected Mean" of Barometer at 9 P.M., <i>minus</i> the Correction <math>\pm\pm</math></b>		=
for Temp. (Col. 4),	= .....	- .....
<b>Mean at Station, corrected, and at 32°, .....</b>		=
Correction for height,	feet, above Mean Sea-level, .....	=
<b>Mean, reduced to 32°, and Sea-level, .....</b>		=
<b>Highest Reading, corrected for Index error, on the</b> .....		th, .....
<b>Lowest "Do.,</b> .....		th, .....
<b>Difference, or Monthly Range, .....</b>		=

<b>S.-R. THERMOMETER,</b> (in shade, etc.), <b>Highest in Month,</b> (corrected for Index Errors), on the _____ th, .....	=
<b>Lowest in Month,</b> corrected for Index errors, on the _____ th, .....	=
Difference, or <b>Monthly Range,</b> .....	=
"Corrected <b>Mean</b> " of all the <b>Highest,</b> (Col. 5), .....	=
"Corrected <b>Mean</b> " of all the <b>Lowest,</b> (Col. 6), .....	=
Difference, or <b>Mean Daily Range,</b> .....	=
** Calculated <b>Mean Temperature</b> of Month, .....	=
<b>S.-R. THERMOMETER, Black Bulb in Sun, Highest,</b> (corrected, for Index errors), on the _____ th, .....	=
"Corrected <b>Mean,</b> " (Col. 7), of <b>Black Bulb, Max. in Sun,</b> .....	=
<b>Lowest at Night,</b> Black Bulb, (corrected for Index errors), on the _____ th, ...	=
"Corrected <b>Mean</b> " (Col. 8), of <b>Black Bulb Min.</b> on grass, .....	=
Difference of above Means or Range ("exposed"), .....	=

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

[illegible]

Observations made and  
Return verified by

(Signed) \_\_\_\_\_

1061



WITH REMARKS ON THE USE OF INSTRUMENTS.

registering the greatest heat from the sun's rays, and the least during night. Their balls have a black coating of lamp black and printer's ink. They are placed in shallow blackened boxes, whose sides protect the balls from the wind. The "*Macimum*" should be freely exposed to the sun, and the "*Minimum*" should rest on wooden supports a few inches from the surface of the grass, in an open situation. Snow must not be allowed to cover either of these Thermometers; nor the sun's heat to affect the Minimum Thermometer by dissipation.

to be compared with the dry bulb of the Hygrometer. The freezing-point of each Thermometer (marked by a scratch on the tube) ought to be tested once a year, in snow or melting ice. For comparison of Thermometers, a properly tested Thermometer may be had, on loan, by any observer, from the Meteorological Secretary.

The *Hygrometer* consists of two Thermometers usually, but not necessarily, mounted on one frame. As apparently slight deviations from the approved and *well-tested form* of this apparatus seriously vitiate the "Hygrometrical Deductions," Observers, are specially requested to attend to the following conditions.

cotton, which also supplies it with water. It must be seen to by the observer that the muslin is always *clean* and *moist*, and the water pure. In frosty weather observation is a matter of much delicacy, and must be made with great care. The bulb must be moistened by immersion from 15 to 30 minutes before the hour of observation. From the film of ice thus formed evaporations will proceed as from the moist cloth in ordinary circumstances.

One form of "Mason's" hygrometer is highly objectionable. The frame of the Thermometers is enclosed in a tin case, which also supports the water cup underneath. This arrangement must be immediately altered by pulling the boxwood frame out of the tin case, and hanging them side by side, so that the forementioned requirements shall be complied with, as far as possible.

reading Rutherford's "*Max.*" and "*Min.*" Thermometers, the indication of that end of the *index* which is next to the surface of the mercury or alcohol is alone noted. Readings of the Thermometers, especially of the wet and dry *bulbs*, must be rapidly taken, being so readily affected by heat from the person of the observer.

mean direction must be taken; and when it is stationary, and always when the wind is feeble, reference must be made to the direction of the lower strata of clouds overhead, and to the direction of smoke, etc.

(Careful observations ought to be made on the changes in the

vatory be furnished with a Hemispherical-Cup Anemometer, a self-registering instrument which shows the amount of Wind that passes it per day; from which also the Velocity of the Wind at the time of observation may be ascertained. For indicating the Force of the Wind, at any particular hour of observation, Lind's Anemometer is also recommended; the method of *Esti-*

*matting* Wind force by such tables as that given in the schedule is, to say the least, unsatisfactory.

*Rain-gauges.*—Many causes conspire to produce anomalies in rain returns. They arise, partly, from unfavourable situation for observation and partly from the defective nature of the instruments used. It is, indeed, difficult to obtain an unexpected position for the rain-gauge; but in all cases the gauge must be sunk in the ground till its edges are on a level with the close cut grass around its mouth. The rain-gauge ought to be read daily, and the readings entered in the returns on the day on which the rain fell.

*Snow-falls* may, for convenience, be registered in the rain columns, under the following conditions:—when a snow shower occurs it must be noted in the "Remarks," and the letter S affixed to the depth of water received in gauge. The depth of the snow must be measured in some open place where no drift is observed, and registered in addition to, and as a check upon, the indications of the rain-gauge. For wind, rain, and snow, as indicated in every column the observer cannot be too careful to register *observations* only;—noting that partakes of the nature of deduction or inference.

*Clouds.*—Convenient abbreviations for Luke Howard's

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BOOK-I

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POST.

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First Cut  
or Raised.

	In Ear
	or Flower.

OF THE  
appearing  
Ground.

THE PERIODICAL RETURN	CHOPS.	Sowing or Planting.	At
	Barley, . . . . .		
	Bere or Bigg, . . . . .		
	Wheat, . . . . .		
	Beans, . . . . .		
	Pease, . . . . .		
	Potatoes, . . . . .		
	Turnips, . . . . .		
	Hay Grass, . . . . .		

[illegible][illegible]

Alder, .	POINES
Ash, .	
Beech, .	
Birch, .	
Elm, .	
Larch, .	
Lime, .	
Oak, .	
Sycamore	

## OBSERVATIONS IN CONNECTION WITH THE PERIODICAL RETURN OF THE SEASONS.

SHRUBS, ETC.	Barberry, . . . . .	
	Bourtree or Elder, . . . . .	
Fruits.	Broom, . . . . .	
	Hazel, . . . . .	
First in Blossom.	Black Currant, . . . . .	
	Apple, . . . . .	
First in Blossom.	Cherry, . . . . .	
	Gooseberry, . . . . .	
First in Blossom.	Rasp, . . . . .	
	Strawberry, . . . . .	
First in Blossom.	Plum, . . . . .	
	Pear, . . . . .	
First in Blossom.	Holly, . . . . .	
	Laburnum, . . . . .	
First in Blossom.	Lilac, . . . . .	
	Mezerion, . . . . .	
First in Blossom.	Mountain Ash or Rowan, . . . . .	
	Red Flowering Currant, . . . . .	
First in Blossom.	Rhododendron Ponticum, . . . . .	
	Vib., . . . . .	
MIGRATORY BIRDS.	Cuckoo, . . . . .	
	Curlew, . . . . .	
First in Arrival.	House-Swallow, . . . . .	
	Lapwing, . . . . .	
First in Arrival.	Plover, . . . . .	
	Sand-Martin, . . . . .	
First in Arrival.	Starling, . . . . .	
	Sparrow, . . . . .	
First in Arrival.	Rail or Corn Crane, . . . . .	
Department.		

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

BOOK-POST.

*Secretary of the Meteorological Society of Scotland.*

EDINBURGH.

Mr ALEXANDER BUCHAN,

To

London  
August 1867