

# SCOTTISH METEOROLOGICAL SOCIETY.

Observations taken at Leith, County of Edinburgh, in Lat 55° 56' 0" N, Long 3° 2' 40" W, Distance from Sea one miles.  
 Height of Cistern of the Barometer above Mean Sea-level 90 feet, above Ground 4 feet. During the MONTH of January 1874.  
 The Hours of Observation are of Greenwich Time.

ELECTRICITY.	Days of Month.	BAROMETER.				SELF-REGISTERING THERMOMETERS. Read Daily, at 9 P.M.				HYGROMETER.				WIND.				RAIN.		CLOUDS.				THERMOMETERS under Ground.			SEA.	OZONE.	GENERAL REMARKS.	Days of Month.																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																							
		9 h. A.M.		9 h. P.M.		Protected in Shade, 4 feet above Ground.		Exposed Black Bulbs.		9 h. A.M.		9 h. P.M.		9 h. A.M.		9 h. P.M.		No. of hours in which it fell.	Amount in inches.	9 A.M.		P.M.		9 h. A.M.																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																													
		Barometer, No.	Atmospheric Thermometer.	Barometer, No.	Atmospheric Thermometer.	Max. No.	Min. No.	Max. in Sun rays No.	Min. on Grass No.	Dry bulb.	Wet bulb.	Dry bulb.	Wet bulb.	Direction.	Force.	Direction.	Force.			9 h. A.M.	No.	Amount (0-10), and Direction.	Amount (0-10), and Species.	Amount (0-10), and Species.	No. 8 inches.	No. 12 inches.					No. 22 inches.																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																						
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BAROMETER, “corrected Mean” at 9 A.M., minus the Correction†† = 29.727  
 for Temp. (Col. 2), = 29.728... — 0.061 = 29.727  
 “Corrected Mean” of Barometer at 9 P.M., minus the Correction†† = 29.735  
 for Temp. (Col. 4), = 29.805 — 0.070 = 29.735  
 Mean at Station, corrected, and at 32°, = 29.731  
 Correction for height, feet above Mean Sea-level, = 1.01  
 Mean, reduced to 32°, and Sea-level, = 29.832  
 Highest Reading, corrected for Index error, on the 26th, = 30.500  
 Lowest Do. Do., on the 18th, = 29.030  
 Difference, or Monthly Range, = 1.470

S.-R. THERMOMETER, (in shade, etc.), Highest in Month, (corrected for Index Errors), on the 18th, = 52.0  
 Lowest in Month, corrected for Index errors, on the 19th, = 27.0  
 Difference, or Monthly Range, = 25.0  
 “Corrected Mean” of all the Highest, (Col. 5), = 45.0  
 “Corrected Mean” of all the Lowest, (Col. 6), = 34.7  
 Difference, or Mean Daily Range, = 10.3  
 \*\* Calculated Mean Temperature of Month, = 39.8

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

HYGROMETER, Mean (corrected) A.M. and P.M. Reading of Dry Bulb, (Cols. 9 and 11), = 39.8  
 Mean (corrected) A.M. and P.M. Reading of Wet Bulb, (Cols. 10 and 12), = 37.2  
 ‡ Computed Temperature of Dew-Point, = 35.0  
 ‡ Do. Elastic Force of Vapour, = 2.05  
 ‡ Do. Weight of Vapour in a Cubic Foot of Air, =  
 ‡ Relative Humidity, (Saturation = 100), = 87  
 RAIN fell on 9 Days; Amount in Inches, = 1.38

WIND.		SUMMARY.									
Direction.		N	NE	E	SE	S	SW	W	NW	Mean or Variable.	Mean Velocity in miles per day.
A.M.							4	14	12	1	
P.M.							2	17	12		
Mean.		0	0	0	0	3	15	12	1		

\* 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.  
 † Enhancing corrections for both capillarity and Index Errors.  
 ‡ The Diurnal Range for Scotland is as yet unknown.  
 ‡ Practically, though not absolutely a mean correction.  
 ‡ These “Hygrometrical Deductions” are calculated from Glaisher’s Hygrometrical Tables, Second Edition only.  
 ‡ While the Diurnal Range is unknown, the Arithmetical Mean of Cols. 5 and 6 will be entered as the “Calculated Mean Temperature.”  
 ‡ Any Observations not taken under the conditions specified in the Directions on the other side, or noted at the Top of each column, must be marked as such by the observer, in each Schedule. See over.

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

Observations made and Return verified by William Mainstone (Signed)



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 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 only) twice a-day for some, and once (naming or evening) for other instruments, as specified, in the following remarks, or at the top of the schedule. It is hoped that the utmost punctuality in the time of reading the instruments will be observed. Observers, in some few cases, may find this impossible in such instances they are specially requested to mark opposite every reading 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. Not 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-sized 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 is constructed by Mr. Aikin of London, the use of which is attended with the great convenience of requiring no *adjustment* of the cistern. Its *scale-rod* is 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 the 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 *scrow*, to form one *stretch-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 *aneroid*.

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* in the cistern. Then *scrow* 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 uprightmost. 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 *slight 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—usually the lower edge of the venturi, 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 inside, 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 from the publishers.

**Self-registering Thermometers.**—Professor Phillips, and N. Segretti and Zambrini's Patent "Maximum" Thermometers are recommended: printed directions for their use may be obtained with each instrument. The "Minimum" Thermometer of Rutland 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 striking the instrument repeatedly against the palm of the hand; when part of the spirit distils by high temperature, it will be found near the top of the tube, and must be dislodged from thence by heating that part over a lamp; the alcohol will evaporate and again condense so being horizontally. 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 melted, 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 distillation.

**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, under 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 seriously vitiate the "Hygrometrical Deductions" Observers are specially requested to attend to the following conditions:—The bulbs must *hang down* by at least an inch free from the scales and frame to which they are attached; the frame must be such as will bring the tubes forward by an inch, from any board on which it may be suspended; the water-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 man must be of medium fineness, and fastened at the neck of the bulb by the cotton, which also supplies it with water. It must be seen to by the observer that the man is always *clean* and *moist*, and that the water pure. In frosty weather observation is a matter of delicacy, and must be made with great care. The bulb must be protected 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—89.9, 40.0, or 40.1; or again, 40.3, 40.5, or 40.6, according as it indicates a little under, an exact coincidence with, or a little over 40°, or 40.3°, respectively. So also 94.1, and 40.3°, more or less must be registered 40.2 or 40.3, and 40.7, 40.8 respectively. In reading Ruthven'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, since, in winter at least, the extremes may occur at any hour; and it is necessary to refer their occurrence to their proper meteorological day. In the Society's schedule, the indications registered on the 2d, are those of a series of phenomena commencing at 9 p.m. on the 2d, and extending till 9 p.m. on the 3d.

**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, 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, &c.

Careful observations ought to be made on the changes in the direction of the wind; and during storms it is especially recommended that extra observations 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 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 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 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.

**Snowfalls 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"; The depth of snow must be measured in some open place where no drift is observed, and registered in addition to, and as a check upon, the indications of the rain-gauge. For wind, rain, and snow, as indicated in every column, the observer cannot be too careful to register *observations* only; and nothing that partakes of the nature of deduction or inference.

**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 *cloud* 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 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," 2, W., (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.

**Sunshine.**—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 conveniently, extra sea observations might be taken for other and greater depths, judging 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 well and of the water noted.

**Ozone.**—Mention whether Schomburgk's or Moffat's papers are used. The paper is affixed by a pin to a board in the three-meter box, and the indication registered at 9 a.m. and 9 p.m. It is noted that these indications be registered in connection with the force and direction of the wind at the time of observation, in the following manner:—thus 3°, as an ozone entry in the schedule, will indicate that the ozone paper is tinted as 4° on the scale, that the wind 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. 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, &c. Remarks ought to be made on the occurrence of meteors, aurora borealis, remarkable depressions and elevations of the barometer, thunder storms, and remarkable falls of snow, hail, or rain, the hour of storms 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 in one, 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 or on the side-marginal. 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. Observations ought to be confined to individual trees and shrubs; to particular species of birds; and in the case of crops, to specified sorts reared from year to year on a selected piece of ground or farm.

The Council recommend that *term 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 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.

EDINBURGH.

OBSERVATIONS IN CONNECTION WITH THE PERIODICAL RETURN OF THE SEASONS.

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

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

Have the goodness also to state any information you may be able to collect relative to the Crops of Grain, Hay, Potatoes, Turnips, Fruits, 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.

General Post Office Buildings,

Secretary of the Meteorological Society of Scotland,

MR ALEXANDER BUCHAN,

7.





# SCOTTISH METEOROLOGICAL SOCIETY.

Observations taken at Inveresk, County of Edinburgh, in Lat. 55° 56' 0" N Long. 3° 2' 40" W Distance from Sea one miles.

Height of Cistern of the Barometer above Mean Sea-level 90 feet, above Ground 4 feet.

During the MONTH of Feb 1874

The Hours of Observation are of Greenwich Time.

[illegible]

<b>BAROMETER,</b> "corrected Mean " at 9 A.M., <i>minus</i> the Correction <sup>††</sup>	=	29.841
for Temp. (Col. 2), = 29.900... - .059		
<b>"Corrected Mean "</b> of Barometer at 9 P.M., <i>minus</i> the Correction <sup>††</sup>	=	29.833
for Temp. (Col. 4), = 29.908.. - .075		
<b>Mean at Station, corrected, and at 32°,.....</b>	=	29.837
Correction for height, feet above Mean Sea-level,.....	=	101
<b>Mean, reduced to 32°, and Sea-level,.....</b>	=	29.938
Highest Reading, corrected for Index error, on the 14 <sup>th</sup> ,.....	=	30.610
Lowest Do. Do., on the 23 <sup>th</sup> ,.....	=	28.840
Difference, or <b>Monthly Range</b> ,.....	=	1.770

<b>S.-R. THERMOMETER,</b> (in shade, etc.), <b>Highest in Month,</b> (corrected for Index Errors), on the <u>4<sup>th</sup></u> .....	=	<u>52.0</u>
<b>Lowest in Month,</b> corrected for Index errors, on the <u>10<sup>th</sup></u> , .....	=	<u>19.0</u>
Difference, or <b>Monthly Range,</b> .....	=	<u>33.0</u>
"Corrected <b>Mean</b> " of all the <b>Highest,</b> (Col. 5) .....	=	<u>44.8</u>
"Corrected <b>Mean</b> " of all the <b>Lowest,</b> (Col. 6), .....	=	<u>31.8</u>
Difference, or <b>Mean Daily Range,</b> .....	=	<u>13.0</u>
* <sup>o</sup> Calculated <b>Mean Temperature</b> of Month, .....	=	<u>38.3</u>
<hr/>		
<b>S.-R. THERMOMETER, Black Bulb in Sun, Highest,</b> (corrected for Index Errors), on the <u>      </u> 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 <u>      </u> th, ...	=	
"Corrected <b>Mean,</b> " (Col. 8), of <b>Black Bulb, Min.</b> on grass, .....	=	
Difference of above Means or Range ("exposed"), .....	=	

<b>HYGROMETER, Mean</b> (corrected) A.M. and P.M. Reading of <b>Dry Bulb</b> , (Cols. 9 and 11), .....	=	35.8
<b>Mean</b> (corrected) A.M. and P.M. Reading of <b>Wet Bulb</b> , (Cols. 10 and 12), .....	=	35.0
## Computed <b>Temperature of Dew-Point</b> , .....	=	33.8
## Do. <b>Elastic Force of Vapour</b> , .....	=	.195
## Do. <b>Weight of Vapour in a Cubic Foot of Air</b> , ...	=	
## <b>Relative Humidity</b> , (Saturation = 100), .....	=	91
<b>RAIN</b> fell on > Days; Amount in Inches, .....	=	1.22

WIND.		SUMMARY.									
Direction.	N	NE	E	SE	S	SW	W	NW	Calm or Variable.	Mean Force.	Mean Velocity in miles per day.
A.M.			1		1	14					
P.M.	2	1	1	2	3	13					
Mean.	1	1	1	1	10	14	0	0		150	

Observations made and  
Return verified by

William M. Austin

(Signed)







## SCOTTISH METEOROLOGICAL SOCIETY.

Observations taken at Inverurie, County of Edinburgh, in Lat. 55° 56' 0" N, Long. 3° 2' 40" W, Distance from Sea 100 miles.  
Height of Cistern of the Barometer above Mean Sea-level 90 feet, above Ground 4 feet. During the MONTH of March 1874.  
The Hours of Observation are of Greenwich Time.

ELECTRICITY.	Days of Month.	BAROMETER.				SELF-REGISTERING THERMOMETERS. Read Daily, at 9 P.M.				HYGROMETER. No. —				WIND.				RAIN.		CLOUDS.				THERMOMETERS under Ground.				SEA.	OZONE.	GENERAL REMARKS.  As to occurrence of Thunder, Lightning, Storms, Hail, Meteors, Remarkable Depression or Elevation of Barometer, Prevalent Diseases, etc.  Mention the hour at which Storms, including Thunder and Lightning, began and ended.	Days of Month.		
		9 h. A.M.		9 h. P.M.		Protected in Shade, 4 feet above Ground.		Exposed Black Bulbs.		9 h. A.M.		9 h. P.M.		9 h. A.M.		9 h. P.M.		No. of hours in which it fell.	Amount in inches.	9 A.M.		P.M.		9 h. A.M.									
		Barometer. * No.	Attached Thermometer	Barometer. No.	Attached Thermometer	Max. No.	Min. No.	Max. in Sun-rays.	Min. on Grass.	Dry bulb.	Wet bulb.	Dry bulb.	Wet bulb.	Direction.	Force.	Direction.	Force.			No. 9 h. A.M.	Velocity (0—6), and Direction.	Amount (0—10), and Species.	Velocity (0—6), and Direction.	Amount (0—10), and Species.	No. 3 inches.	12 inches.	No. 22 inches.						
1	29.90	50	30.15	53	52	36			41	39	40	39	S	2	S	1		-01											Very high Barom. at 9 A.M. on the 1 <sup>st</sup>	1			
2	30.35	52	30.54	54	52	38			42	41	44	43	S	1	S	1													gales of wind occurred on the 2 <sup>nd</sup>	2			
3	30.53	53	30.50	57	53	36			41	40	43	44	SW	1	SW	1													19 <sup>th</sup> and 28 <sup>th</sup> of 30 <sup>th</sup>	3			
4	30.50	53	30.50	54	52	41			44	43	47	46	SW	1	SW	1													Rainbows seen on the 8 <sup>th</sup> 29 <sup>th</sup> & 31 <sup>st</sup>	4			
5	30.50	53	30.80	56	46	29			43	43	35	34	S	1	E	2													Rainbow Hale seen on the 30 <sup>th</sup>	5			
6	30.90	51	30.70	55	47	31			34	33	36	35	SW	1	SW	1		34											This month has been very favourable for Farmers getting in their crops	6			
7	30.60	50	30.22	53	48	40			36	35	44	42	SW	2	SW	1													which are nearly all sown in this locality. Measels are very prevalent here but very mild.	7			
8	29.82	54	29.62	53	47	29			44	42	33	34	W	4	WSW	4															8		
9	29.65	51	29.70	50	46	26			31	30	27	26	W	1	E	1															9		
10	29.82	44	29.98	48	35	24			29	28	26	26	NE	2	N	2																10	
11	30.06	47	30.20	47	35	25			26	26	28	27	N	1	N	1																11	
12	30.04	48	30.20	51	44	32			36	35	38	37	SW	1	SW	1																12	
13	30.27	46	30.36	52	53	38			36	35	44	42	W	1	W	1																13	
14	30.30	51	30.20	53	50	42			43	44	46	44	SW	2	SW	1																14	
15	30.20	54	30.13	59	49	44			48	47	48	47	W	2	W	2																15	
16	30.07	53	29.85	60	54	45			48	47	48	47	WSW	2	W	2																16	
17	29.83	53	29.85	60	54	42			50	49	49	48	W	3	W	4																17	
18	29.80	54	30.10	58	56	34			44	42	40	39	W	3	W	2																18	
19	29.73	52	29.60	52	51	33			38	38	38	37	SSW	2	SSW	3		24														19	
20	29.85	51	30.05	51	48	38			40	39	43	42	SSW	1	SW	1																20	
21	29.86	51	29.76	52	47	37			46	45	44	42	SSW	2	SSW	2		04														21	
22	29.86	54	30.05	60	54	45			44	43	48	47	SSW	2	SSW	2																22	
23	30.15	54	30.13	58	53	44			48	47	48	47	SSW	1	SSW	1																23	
24	30.20	53	30.50	58	54	31			43	44	35	34	SSW	2	SSW	1																24	
25	30.51	54	30.33	59	56	29			37	36	33	31	S	1	SSW	1																25	
26	30.30	53	30.10	60	58	37			41	39	37	35	S	1	SSW	1																26	
27	29.80	53	29.54	58	52	39			47	46	44	43	SW	2	SW	4		05														27	
28	29.81	54	29.53	53	53	40			44	43	47	46	SW	3	W	5		02														28	
29	29.31	53	29.33	53	51	39			49	49	44	44	SW	1	WSW	4		10														29	
30	29.36	52	29.70	54	50	38			43	43	46	45	W	3	W	4		30														30	
31	29.44	52	29.47	53	50	35			47	47	38	37	W	1	W	4		09														31	
Sums.	168	10	138	13	13	15			14	16	17	16						1															
	134	65	163	152	02	169			69	20	25	300						11															
Means.	30.043	52.1	30.052	57.9	50.1	36.1			41.6	40.6	40.8	39.7																					
+ Total Corrections for Instrumental Errors.																																	
+ Corrections for Diurnal Range.																																	
"Corrected Means."																																	
No. of Column.	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30			

BAROMETER, "corrected mean" at 9 A.M., minus the Correction<sup>††</sup> for Temp. (Col. 2), = 29.981  
"Corrected Mean" of Barometer at 9 P.M., minus the Correction<sup>††</sup> for Temp. (Col. 4), = 29.981  
Mean at Station, corrected, and at 32°, = 29.981  
Correction for height, feet above Mean Sea-level, = 1.01  
Mean, reduced to 32°, and Sea-level, = 30.082  
Highest Reading, corrected for Index error, on the 6<sup>th</sup>, = 30.900  
Lowest Do. Do., on the 29<sup>th</sup>, = 29.310  
Difference, or Monthly Range, = 1.590

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

S.-R. THERMOMETER, (in shade, etc.), Highest in Month, (corrected for Index Errors), on the 26<sup>th</sup>, = 58.0  
Lowest in Month, corrected for Index errors, on the 10<sup>th</sup>, = 24.0  
Difference, or Monthly Range, = 34.0  
"Corrected Mean" of all the Highest, (Col. 5), = 50.1  
"Corrected Mean" of all the Lowest, (Col. 6), = 36.1  
Difference, or Mean Daily Range, = 14.0  
\*\* Calculated Mean Temperature of Month, = 43.1  
S.-R. THERMOMETER, Black Bulb in Sun, Highest, (corrected for Index Errors), on the    th, =     
"Corrected Mean," (Col. 7), of Black Bulb, Max. in Sun, =     
Lowest at Night, Black Bulb, (corrected for Index errors), on the    th, =     
"Corrected Mean," (Col. 8), of Black Bulb, Min. on grass, =     
Difference of above Means or Range ("exposed"), =   

HYGROMETER, Mean (corrected) A.M. and P.M. Reading of Dry Bulb, (Cols. 9 and 11), = 41.2  
Mean (corrected) A.M. and P.M. Reading of Wet Bulb, (Cols. 10 and 12), = 40.8  
†† Computed Temperature of Dew-Point, = 38.7  
†† Do. Elastic Force of Vapour, = 1.235  
†† Do. Weight of Vapour in a Cubic Foot of Air, =     
†† Relative Humidity, (Saturation = 100), = 92  
RAIN fell on 9 Days; Amount in Inches, = 1.19

WIND.	SUMMARY.										Mean Force.	Mean Velocity in miles per day.
	Direction.	N	NE	E	SE	S	SW	W	NW	Calm or Variable.		
A.M.		1	1			11	8	9	1			
P.M.		2		2		9	7	10	1			
Mean.		1	1	0	10	8	9	1			1.95	

3.81

Observations made and  
Return verified by

William Munro

(Signed)

12.55  
97







## SCOTTISH METEOROLOGICAL SOCIETY.

Observations taken at Leith, County of Edinburgh, in Lat. 55° 56' 0" N, Long. 3° 2' 48" W, Distance from Sea one miles.  
Height of Cistern of the Barometer above Mean Sea-level four feet, above Ground four feet. During the MONTH of April 1874.

The Hours of Observation are of Greenwich Time.

ELECTRICITY.	Days of Month.	BAROMETER.				SELF-REGISTERING THERMOMETERS. Read Daily, at 9 P.M.				HYGROMETER. No. —				WIND.				RAIN.		CLOUDS.				THERMOMETERS under Ground.			SEA.	OZONE.	GENERAL REMARKS.  As to occurrence of Thunder, Lightning, Storms, Hail, Meteors, Remarkable Depression or Elevation of Barometer, Prevalent Diseases, etc.  Mention the hour at which Storms, including Thunder and Lightning, began and ended.	Days of Month.																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																
		9 h. A.M.		9 h. P.M.		Protected in Shade, 4 feet above Ground.		Exposed Black Bulbs.		9 h. A.M.		9 h. P.M.		9 h. A.M.		9 h. P.M.		No. of hours in which it fell.	Amount in inches. No. —	9 A.M.		P.M.		9 h. A.M.																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																						
		Barometer. * No. —	Attach- ed Ther- mometer	Barometer. No. —	Attach- ed Ther- mometer	Max. No. —	Min. No. —	Max. in Sun's rays No. —	Min. on Grass. No. —	Dry bulb.	Wet bulb.	Dry bulb.	Wet bulb.	Direc- tion.	Force.	Direc- tion.	Force.			Readings of the H. Cup Anemometer. No. —	9 h. A.M.	Velocity (0—10), and Direction.	Amount (0—10), and Species.	Velocity (0—10), and Direction.	Amount (0—10), and Species.	SUNSHINE.  Hours.					No. — 3 inches.	12 inches.	No. — 22 inches.																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																													
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BAROMETER, "corrected Mean" at 9 A.M., minus the Correction†† for Temp. (Col. 2), = 29.709  
"Corrected Mean" of Barometer at 9 P.M., minus the Correction†† for Temp. (Col. 4), = 29.712  
Mean at Station, corrected, and at 32°, = 29.710  
Correction for height, feet above Mean Sea-level, = 1.00  
Mean, reduced to 32°, and Sea-level, = 29.810  
Highest Reading, corrected for Index error, on the 28<sup>th</sup>, = 30.400  
Lowest Do. Do., on the 24<sup>th</sup>, = 28.600  
Difference, or Monthly Range, = 1.800

\* 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.  
† Embellishing corrections for both capillary and Index errors.  
†† The Diurnal Range for Scotland is as yet unknown.  
‡ Practically, though not absolutely a minus correction.  
§ These "Hygrometrical Deductions" are calculated from Glaisher's Hygrometrical Tables, Second Edition only.  
|| While the Diurnal Range is unknown, the Arithmetical 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.

S.-R. THERMOMETER, (in shade, etc.), Highest in Month, (corrected for Index Errors), on the 1<sup>st</sup> th, = 68.0  
Lowest in Month, corrected for Index errors, on the 11<sup>th</sup>, = 51.0  
Difference, or Monthly Range, = 37.0  
"Corrected Mean" of all the Highest, (Col. 5), = 55.3  
"Corrected Mean" of all the Lowest, (Col. 6), = 58.0  
Difference, or Mean Daily Range, = 17.3  
\*\* Calculated Mean Temperature of Month, = 46.6  
S.-R. THERMOMETER, Black Bulb in Sun, Highest, (corrected for Index Errors), on the 1<sup>st</sup> th, = 68.0  
"Corrected Mean," (Col. 7), of Black Bulb, Max. in Sun, = 68.0  
Lowest at Night, Black Bulb, (corrected for Index errors), on the 11<sup>th</sup>, = 51.0  
"Corrected Mean," (Col. 8), of Black Bulb, Min. on grass, = 51.0  
Difference of above Means or Range ("exposed"), = 17.0

HYGROMETER, Mean (corrected) A.M. and P.M. Reading of Dry Bulb, (Cols. 9 and 11), = 45.2  
Mean (corrected) A.M. and P.M. Reading of Wet Bulb, (Cols. 10 and 12), = 43.8  
† Computed Temperature of Dew-Point, = 42.2  
† Do. Elastic Force of Vapour, = 2.69  
† Do. Weight of Vapour in a Cubic Foot of Air, = 2.69  
† Relative Humidity, (Saturation = 100), = 89  
RAIN fell on 10 Days; Amount in Inches, = 1.17

WIND.		SUMMARY.									
Direction.	N	NE	E	SE	S	SW	W	NW	Calm or Variable.	Mean Force.	Mean Velocity in miles per day.
A.M.		2		4	4	11	9				
P.M.	3	1	2		3	11	8	2			
Mean.	3	2	1	2	4	11	8	1		1.90	

Observations made and  
Return verified by

William McWilliam

(Signed)

19







## SCOTTISH METEOROLOGICAL SOCIETY.

Observations taken at Inverclyde, County of Edinburgh, in Lat. 55° 56' 0" N Long. 3° 2' 40" W Distance from Sea One miles.Height of Cistern of the Barometer above Mean Sea-level 90 feet, above Ground 4 feet.During the MONTH of May 1874

The Hours of Observation are of Greenwich Time.

ELECTRICITY.	Days of Month.	BAROMETER.				SELF-REGISTERING THERMOMETERS. Read Daily at 9 P.M.				HYGROMETER. No. —				WIND.				RAIN.		CLOUDS.				THERMOMETERS under Ground.			SEA.	OZONE.	GENERAL REMARKS.	Days of Month.		
		9 h. A.M.		9 h. P.M.		Protected in Shade, 4 feet above Ground.		Exposed Black Bulbs.		9 h. A.M.		9 h. P.M.		9 h. A.M.		9 h. P.M.		9 A.M.		P.M.		9 h. A.M.										
		Barometer.	Attach- ed Ther- mometer.	Barometer.	Attach- ed Ther- mometer.	Max. No.	Min. No.	Max. in Sun's rays No.	Min. on Grass. No.	Dry bulb.	Wet bulb.	Dry bulb.	Wet bulb.	Direction.	Force.	Direction.	Force.	No. of hours in which it fell.	Amount in inches.	Velocity (0—10), and Direction.	Amount (0—10), and Species.	Velocity (0—10), and Direction.	Amount (0—10), and Species.	No.	3 inches.	12 inches.					No.	22 inches.
		* No.	°	No.	°	No.	No.	No.	No.	°	°	°	°					9 h. A.M.	No.					Hours.	°	°					°	°
		inches.	°	inches.	°	°	°	°	°	°	°	°																				
	1	30.16	57	30.24	60	50	32			48	43	38	37	NE	2	NE	1						6									
	2	30.24	50	30.15	59	52	35			44	42	38	37	NE	1	NE	1						5									
	3	30.10	48	29.94	57	53	38			47	46	40	40	N	1	NE	2						3									
	4	29.96	54	30.05	58	49	40			43	41	42	41	NE	2	NE	1						1									
	5	30.03	56	29.95	58	53	38			44	41	43	42	NE	1	NE	1						2									
	6	29.83	55	29.75	56	49	36			40	40	40	39	NE	2	NE	1						1									
	7	29.75	53	29.74	53	54	36			45	44	39	38	N	1	N	2						3									
	8	29.75	53	29.73	54	52	33			44	43	37	36	NE	2	N	1						2									
	9	29.77	53	29.86	57	62	36			43	42	40	38	NE	1	N	1						3									
	10	29.95	54	30.06	55	52	33			46	44	41	39	NE	1	N	1						4									
	11	30.14	54	30.24	53	60	39			45	44	42	41	NE	1	NE	1						3									
	12	30.30	54	30.40	56	49	39			44	43	43	41	N	2	NE	1						1									
	13	30.44	55	30.48	58	48	35			42	40	41	39	N	1	NE	1						1/2									
	14	30.38	55	30.33	64	51	38			48	48	40	40	NE	1	NE	1						2									
	15	30.30	56	30.40	57	53	31			43	41	36	34	N	2	NE	1						5									
	16	30.44	55	30.37	59	53	32			48	45	40	38	NE	1	NE	1						7									
	17	30.37	55	30.33	60	63	36			48	45	44	42	NE	1	NE	1						11									
	18	30.33	57	30.86	61	57	40			62	48	48	46	NE	1	NE	2						10									
	19	30.37	59	30.37	60	55	42			46	43	47	45	NE	1	NE	1						1 1/2									
	20	30.37	55	30.28	58	55	41			48	45	48	46	NE	1	NE	2						-									
	21	30.20	55	30.05	57	49	41			45	43	43	42	N	1	E	1						-									
	22	29.90	51	29.78	58	50	43			43	41	47	47	SE	1	S	1						01									
	23	29.75	54	29.73	56	53	42			46	46	47	47	E	1	NE	1						-									
	24	29.70	53	29.78	57	49	44			44	44	43	45	NE	2	NE	1						33									
	25	29.87	56	30.01	56	49	46			47	47	47	47	SE	1	SE	1						25									
	26	30.05	54	30.	59	53	48			47	47	50	49	W	1	W	1						-									
	27	30.	59	29.88	60	61	49			53	51	53	53	W	1	W	3						08									
	28	29.80	59	29.87	60	58	39			52	50	50	48	NE	2	NE	1						-									
	29	29.88	60	29.65	60	58	49			53	50	54	54	W	1	W	2						-									
	30	29.56	60	29.67	60	62	51			54	54	53	54	NE	4	NE	2						04									
	31	29.70	61	29.70	64	64	51			56	54	56	54	NE	4	NE	5						-									
Sum.		1512 143	160	1513 107	15 250	13 108	14 302			14 205	10 152	12 134	15 99										3 136									
Means.		30.043	55.2	30.034	58.1	53.5	49.7			466	449	463	32																			
† Total Corrections for Instrumental Errors.																																
† Corrections for Diurnal Range.																																
"Corrected Means."																																
No. of Column.		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	

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

TABLE FOR ESTIMATING FORCE OF WIND.					
Estimated Force, 0—6.	Common Designation.	Estimated Force 0—6.	Common Designation.	Estimated Force, 0—6.	Common Designation.
0	" Calm	1.5	" Light breeze	4	" Blowing hard
0.5	" Very light air	2.	" Fresh breeze	5	" Blowing a gale
1.	" Light air	3.	" Very fresh	6	" Violent gale

BAROMETER, "corrected Mean" at 9 A.M., minus the Correction†† = 29.971  
for Temp. (Col. 2), = 30.043... - 0.072 = 29.971  
"Corrected Mean" of Barometer at 9 P.M., minus the Correction†† = 29.955  
for Temp. (Col. 4), = 30.034... - 0.079 = 29.955  
Mean at Station, corrected, and at 32°, = 29.963  
Correction for height, feet above Mean Sea-level, = 100  
Mean, reduced to 32°, and Sea-level, = 30.063  
Highest Reading, corrected for Index error, on the 13 th, = 30.440  
Lowest Do. Do., on the 30 th, = 29.560  
Difference, or Monthly Range, = 0.880

S.-R. THERMOMETER, (in shade, etc.), Highest in Month, (corrected for Index Errors), on the 17 th, = 65.0  
Lowest in Month, corrected for Index errors, on the 15 th, = 51.0  
Difference, or Monthly Range, = 14.0  
"Corrected Mean" of all the Highest, (Col. 5), = 55.5  
"Corrected Mean" of all the Lowest, (Col. 6), = 39.7  
Difference, or Mean Daily Range, = 15.8  
\*\* Calculated Mean Temperature of Month, = 46.6

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

HYGROMETER, Mean (corrected) A.M. and P.M. Reading of Dry Bulb, (Cols. 9 and 11), = 45.5  
Mean (corrected) A.M. and P.M. Reading of Wet Bulb, (Cols. 10 and 12), = 44.0  
†† Computed Temperature of Dew-Point, = 42.2  
†† Do. Elastic Force of Vapour, = 2.69  
†† Do. Weight of Vapour in a Cubic Foot of Air, =         
†† Relative Humidity, (Saturation = 100), = 88  
RAIN fell on 11 Days; Amount in Inches, = 1.36

WIND.	SUMMARY.									
	Direction.	N	NE	E	SE	S	SW	W	NW	Calm or Variable.
A.M.		7	10	4	2	1	2	4	1	
P.M.		8	8	5	2	3	1	4		
Mean.		7	9	5	2	2	1	4	1	0

Observations made and Return verified by

William McNeil

(Signed)

148, 2, 36



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 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 only) twice a day for some, and once (morning or evening) for other instruments, as specified, in the following remarks, or at the top of the Schedule. It is hoped that the utmost punctuality in the time of reading the instruments will be observed. Observers, in some few cases, may find this impossible; in such instances, they are specially requested to mark opposite every reading 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 is constructed by Mr Adie of London, the use of which is attended with the great convenience of requiring *no adjustment* of the cistern. Its *scale-inches* are not true inches but so much shorter as to *compensate* the error that would otherwise arise from the fluctuations of the surface of mercury in the cistern. This 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 of the surface of the contained mercury can be adjusted to the *corresponding* level, whose stem passes freely through the lid and cap of the cistern. When the *index-line* on this little piston-rod is brought, by the adjusting screw, to form one *straight line* with those on its ivory frame, the surface of the mercury is then at the exact height from which the scale is graduated. In taking an observation, this *preliminary* setting must be made with scrupulous accuracy; as a slight error here will vitiate the readings from the *terminals*.

When a Barometer having adjustable surfaces has to be removed from its fastenings, the ivory peg must be served so as to form a tight plug to the cistern. Then *scrape* up the mercury to within a quarter of an inch of the top of the tube, and take down the instrument; it should then be carried with the cistern uppermost. Before suspending the Barometer for use, it must be ascertained whether the space above the mercury in the tube is a complete vacuum; this is the case 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 should 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-mercury carefully made. By raising and lowering the eye, it must be brought into the plane of the back and front of the index—usually the lower edge of the vernier, which must be carefully adjusted 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 inside, and fixed 4 feet above grass in an exposed position free from merely local influences. The lids 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 porch. To accommodate a duplicate set of instruments, which is most desirable, doors may also be made to open to the south.

**Self Registering Thermometers.**—Professor Phillips's, and Negretti and Zambra's Patent "*Maximum*" Thermometers are recommended: printed directions for their use may be obtained with each instrument. The "*Minimum*" Thermometer of Rutherford is recommended and should be affixed to a frame separate from the "*Maximum*." It is recommended that these Thermometers be graduated on the glass stem. The "*Minimum*" Thermometer is liable to two derangements, both of which must be guarded against, and may be easily remedied by an observer. When the *column* 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 shade 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 be freely exposed to the sun, and the "*Minimum*" should rest on wooden supports a few inches from the surface of the grass, in an open situation. Snow must not be allowed to cover either of these Thermometers; nor the sun's heat to affect the Minimum Thermometer by distillation.

**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 as are not graduated on the stem, but merely on an attached scale, undergo repairs, they are very liable to be moved from their position on the Scale, and ought never afterwards to be used without being *re-tested*. The self-registering, and specially 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.

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. The bulbs must *hang-down* by at least an inch free from the scales and frame to which they are attached by the frame must be such as will bring the tubes forward by an inch, from any wind on which it may be suspended; the water-cap must be covered, and placed to the side, and a little below the level of the wet bulb,—in no case under the bulb;—the muslin must be of medium fineness, and fastened at the neck of the bulb by the cotton, which also supplies it with water. It must be seen to by the observer that the muslin is always *clean and moist*, and the water pure. In frosty weather observation is a matter of much delicacy, and must be made with great care. The bulb must be moistened by immersion from 15 to 30 minutes before the hour of observation. From the film of ice thus formed evaporation will proceed as from the moist cloth in ordinary circumstances.

**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—38°·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 40¾°, more or less must be registered 40·2 or 40·3 and 40·7 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 Temperatures.**—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; since, in winter at least, the extremes may occur at any hour; and it is necessary to refer their occurrence to their proper meteorological *data*. In the Society's schedules, the indications registered on 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 should be taken; and when it is stationary, and always when the wind is feeble, reference may be made to the direction of smoke, 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 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 may also be recommended; the method of *Estimating* 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 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 round its mouth. The rain-gauge ought to be read daily at 9 A.M., and the readings entered in the returns of the day previous.

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

**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° to 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 should be noted among the "*Remarks*." The amount of cloud is entered from a scale of 0 to 10; thus, "When the sky *overhead* is free from clouds it is entered 0, when *half covered* by clouds, 5 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*" 6, S. W.

and Direction, "—, (for example,) will indicate that the 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.

**Sunshine.**—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 depths of 3, 12, and 22 inches, and the stems above ground protected from the sun's rays, and fitted with sloping tin collars, to prevent rain water being conveyed to the bulbs by the stems or wooded frames. Mention should 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 boats from the ends of piers and rocks round the coast, where it is not interrupted by that of river water. About 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 well and of the water noted.

**Ozone.**—Mention whether Schonbein'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 55°, as an *ozone* entry in the schedule will indicate that the ozone paper is tinted as "3;" on the scale 0—6 is "4"; i. e., that it is *blowing fresh*.

**Electricity.**Two much importance cannot be attached to the 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 unavoidable 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 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, of clouds, velocity, and direction between the lower and upper strata of clouds, the colour of the sky, etc. Remarks ought to be made on the occurrence of meteors, aurora borealis, remarkable depressions and elevations of the barometer, thunder storms, and remarkable falls of snow, hail, or rain, the hour of storms of wind attaining their maximum, as well as such 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 should be recorded.

By the use of abbreviations, the state of the weather at 9 A.M. and 9 P.M. should be registered, either in two columns, otherwise 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 so 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 *term 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 recommend observers, before purchasing new instruments, to 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, November 1874.

BOOK POST.

EDINBURGH.

Secretary of the Meteorological Society of Scotland,

M. ALEXANDER BUCHAN,



FOREST TREES.		CROPS.		CLOTHES.		Sowing or Planting.		Appearing or above ground.		In flower or in leaf.		First Out.	
In flower.		In leaf.		Diseased or injured.		In flower or in leaf.		First Out.		First Out.		First Out.	
Alder.		Ash.		Beech.		Birch.		Elm.		Larch.		Lime.	
Oak.		Sycamore or Plane.		Barley.		Bare or Bigg.		Oats.		Wheat.		Pease.	
Rye Grass.		Turnips.		Potatoes.		Plum.		Strawberry.		Rasp.		Black Currant.	
Apple.		Cherry.		House-Swallow.		Lapwing.		Plover.		Sand-Martin.		Starling.	
Swan.		Rall or Corn Crake.		Cuckoo.		Cuckoo.		Cuckoo.		Cuckoo.		Cuckoo.	
First in Blossom.		First in Blossom.		First in Blossom.		First in Blossom.		First in Blossom.		First in Blossom.		First in Blossom.	
Barberry.		Boutree or Elder.		Black Currant.		Cherry.		House-Swallow.		Lapwing.		Plover.	
Holly.		Groseberry.		Sand-Martin.		Starling.		Swan.		Rall or Corn Crake.		Cuckoo.	
Laburnum.		Plum.		Strawberry.		Rasp.		Black Currant.		Cherry.		House-Swallow.	
Lily.		Rasp.		Black Currant.		Cherry.		House-Swallow.		Lapwing.		Plover.	
Mezereum.		Rasp.		Black Currant.		Cherry.		House-Swallow.		Lapwing.		Plover.	
Mountain Ash or Rowan.		Rasp.		Black Currant.		Cherry.		House-Swallow.		Lapwing.		Plover.	
Red Flowering Currant.		Rasp.		Black Currant.		Cherry.		House-Swallow.		Lapwing.		Plover.	
Rhododendron Ponticum.		Rasp.		Black Currant.		Cherry.		House-Swallow.		Lapwing.		Plover.	
Whin.		Rasp.		Black Currant.		Cherry.		House-Swallow.		Lapwing.		Plover.	

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



# SCOTTISH METEOROLOGICAL SOCIETY.

Observations taken at Inveresk, County of Edinburgh, in Lat. 55° 56' 0" N Long. 3° 2' 40" W Distance from Sea One miles.  
Height of Cistern of the Barometer above Mean Sea-level 90 feet, above Ground 4 feet. During the MONTH of June 1874.  
The Hours of Observation are of Greenwich Time.

[illegible]

<b>BAROMETER,</b> "corrected Mean" at 9 A.M., <i>minus</i> the Correction <sup>††</sup>		=	30.025
for Temp. (Col. 2), = 30.118 ... .. 093			
<b>"Corrected Mean"</b> of Barometer at 9 P.M., <i>minus</i> the Correction <sup>††</sup>		=	30.019
for Temp. (Col. 4), = 30.113 ... .. 094			
<b>Mean at Station, corrected, and at 32°</b> ,.....		=	30.022
Correction for height, feet above Mean Sea-level,.....		=	098
<b>Mean, reduced to 32°, and Sea-level</b> ,.....		=	30.120
Highest Reading, corrected for Index error, on the 13th,.....		=	30.700
Lowest Do. Do. on the 5th,.....		=	29.640
Difference, or <b>Monthly Range</b> ,.....		=	1.060

**S.-R. THERMOMETER**, (in shade, etc.), **Highest in Month**, (corrected for Index Errors), on the 28th, ..... = 73.0

**Lowest in Month**, corrected for Index errors, on the 11th, ..... = 38.0

Difference, or **Monthly Range**, ..... = 35.0

"Corrected **Mean**" of all the **Highest**, (Col. 5), ..... = 65.8

"Corrected **Mean**" of all the **Lowest**, (Col. 6), ..... = 46.0

Difference, or **Mean Daily Range**, ..... = 19.8

\* Calculated **Mean Temperature** of Month, ..... = 55.4

**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"), ..... =

<b>HYGROMETER, Mean</b> (corrected) A.M. and P.M. Reading of Dry Bulb, (Cols. 9 and 11), .....	=	55.3
<b>Mean</b> (corrected) A.M. and P.M. Reading of Wet Bulb, (Cols. 10 and 12), .....	=	52.6
‡ Computed <b>Temperature of Dew-Point</b> , .....	=	50.0
‡ Do. <b>Elastic Force of Vapour</b> , .....	=	362
‡ Do. <b>Weight of Vapour in a Cubic Foot of Air</b> , ...	=	
‡ <b>Relative Humidity</b> , (Saturation = 100), .....	=	83
<b>RAIN</b> fell on 6 Days; Amount in Inches, .....	=	1.82

WIND.		SUMMARY.									
Direction.	N	NE	E	SE	S	SW	W	NW	Calm or Variable.	Mean Force.	Mean Velocity in miles per day.
A.M.	3	3	2		2	7	6	1			
P.M.	4		3		7	6	7	2			
Mean.	4	2	2	0	7	7	6	2	0	1.65	

273

Observations made and  
Return verified by

(Signed).

1650







# SCOTTISH METEOROLOGICAL SOCIETY

Observations taken at Inverisk, County of Edinburgh, in Lat. 55° 56' 0" N, Long. 3° 2' 40" W, Distance from Sea one miles.

Height of Cistern of the Barometer above Mean Sea-level 90 feet, above Ground 4 feet.

During the MONTH of July 1874

The Hours of Observation are of Greenwich Time.

[illegible]

<b>BAROMETER,</b> "corrected Mean" at 9 A.M., <i>minus</i> the Correction $\uparrow$ †	=	29.830
for Temp. (Col. 2), = 29.930 - 100	=	29.830
"Corrected Mean" of Barometer at 9 P.M., <i>minus</i> the Correction $\uparrow$ †	=	29.820
for Temp. (Col. 4), = 29.920 - 10.2	=	29.820
<b>Mean at Station, corrected, and at 32°,.....</b>	=	29.826
Correction for height, feet.above Mean Sea-level,.....	=	97
<b>Mean, reduced to 32°, and Sea-level,.....</b>	=	29.923
Highest Reading, corrected for Index error, on the 16 th,.....	=	30.270
Lowest Do. Do, on the 28 th,.....	=	29.550
Difference, or <b>Monthly Range,</b> .....	=	0.720

<b>S.-R. THERMOMETER,</b> (in shade, etc.), <b>Highest in Month,</b> (corrected for Index Errors), on the <u>18</u> th.....	=	<u>85.0</u>
<b>Lowest in Month,</b> corrected for Index errors, on the <u>5</u> / <u>12</u> th, <u>28</u> .....	=	<u>45.0</u>
Difference, or <b>Monthly Range,</b> .....	=	<u>40.0</u>
"Corrected <b>Mean</b> " of <b>all the Highest,</b> (Col. 5), .....	=	<u>88.3</u>
"Corrected <b>Mean</b> " of <b>all the Lowest,</b> (Col. 6), .....	=	<u>81.5</u>
Difference, or <b>Mean Daily Range,</b> .....	=	<u>16.8</u>
** Calculated <b>Mean Temperature</b> of Month, .....	=	<u>59.9</u>
 <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, Mean</b> (corrected) A.M. and P.M. Reading of <b>Dry Bulb</b> , (Cols. 9 and 11), .....	=	58.3
<b>Mean</b> (corrected) A.M. and P.M. Reading of <b>Wet Bulb</b> , (Cols. 10 and 12), .....	=	56.8
‡‡ <b>Computed Temperature of Dew-Point</b> , .....	=	55.4
‡‡ <b>Do. Elastic Force of Vapour</b> , .....	=	.432
‡‡ <b>Do. Weight of Vapour in a Cubic Foot of Air</b> , ...	=	
‡‡ <b>Relative Humidity</b> , (Saturation = 100), .....	=	90
<b>RAIN</b> fell on 12 Days; Amount in Inches, .....	=	3.19

WIND.	SUMMARY.											
Direction.	N	NE	E	SE	S	SW	W	NW	Calm or Variable.	Mean Force.	Mean Velocity in miles per day.	
A.M.				1	2	10	9	2				
P.M.			1		10	7	12	1				
Mean.	0	0	0	1	9	9	10	2		1.46		

2. 1 3

Observations made and  
Return verified by

William McAuslane

(Signed)

146  
5846  
876







## SCOTTISH METEOROLOGICAL SOCIETY.

Observations taken at: Inverclyde, County of Edinburgh, in Lat 55° 56' 0" N Long. 2° 2' 40" W Distance from Sea 1 miles).  
Height of Cistern of the Barometer above Mean Sea-level 90 feet, above Ground 4 feet. During the MONTH of August 1874.  
The Hours of Observation are of Greenwich Time.

ELECTRICITY.	Days of Month.	BAROMETER.				SELF-REGISTERING THERMOMETERS. Read Daily, at 9 P.M.				HYGROMETER. No. _____				WIND.				RAIN.		CLOUDS.				THERMOMETERS under Ground.				SEA.	OZONE.	GENERAL REMARKS.  As to occurrence of Thunder, Lightning, Storms, Hail, Meteors, Remarkable Depression or Elevation of Barometer, Prevalent Diseases, etc.  Mention the hour at which Storms, including Thunder and Lightning, began and ended.	Days of Month.																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																												
		9 h. A.M.		9 h. P.M.		Protected in Shade, 4 feet above Ground.		Exposed Black Bulbs.		9 h. A.M.		9 h. P.M.		9 h. A.M.		9 h. P.M.		No. of hours in which it fell.	Amount in inches.	9 A.M.		P.M.		SUNSHINE.  Hours.	9 h. A.M.																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																		
		Barometer. * No. _____	Attach- ed Ther- mometer No. _____	Barometer. No. _____	Attach- ed Ther- mometer No. _____	Max. No. _____	Min. No. _____	Max. in Shade.	Min. on Grass.	Dry bulb.	Wet bulb.	Dry bulb.	Wet bulb.	Direc- tion.	Force.	Direc- tion.	Force.			Readings of the H. Cup Anemometer. No. _____	9 h. A.M.	Velocity (0-10), and Direction.	Amount (0-10), and Species.		Velocity (0-10), and Direction.	Amount (0-10), and Species.	No. _____					3 inches.	12 inches.	22 inches.																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																									
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BAROMETER, "corrected Mean" at 9 A.M., minus the Correction†† = 29.711  
for Temp. (Col. 2), = 29.805 - 0.094  
"Corrected Mean" of Barometer at 9 P.M., minus the Correction†† = 29.702  
for Temp. (Col. 4), = 29.798 - 0.094  
Mean at Station, corrected, and at 32°, = 29.707  
Correction for height, feet above Mean Sea-level, = 98  
Mean, reduced to 32°, and Sea-level, = 29.805  
Highest Reading, corrected for Index error, on the 21 th, = 30.560  
Lowest Do. Do., on the 14 th, = 29.300  
Difference, or Monthly Range, = 1.260

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

S.-R. THERMOMETER, (in shade, etc.), Highest in Month, (corrected for Index Errors), on the 22 th, = 76.0  
Lowest in Month, corrected for Index errors, on the 29 th, = 41.0  
Difference, or Monthly Range, = 35.0  
"Corrected Mean" of all the Highest, (Col. 5), = 63.5  
"Corrected Mean" of all the Lowest, (Col. 6), = 49.3  
Difference, or Mean Daily Range, = 14.2  
"Calculated Mean Temperature" of Month, = 56.4  
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), = 55.3  
Mean (corrected) A.M. and P.M. Reading of Wet Bulb, (Cols. 10 and 12), = 54.1  
†† Computed Temperature of Dew-Point, = 52.9  
†† Do. Elastic Force of Vapour, = 40.1  
†† Do. Weight of Vapour in a Cubic Foot of Air, =  
†† Relative Humidity, (Saturation = 100), = 92  
RAIN fell on 17 Days; Amount in Inches, = 4.79

WIND.	SUMMARY.									
	Direction.	N	NE	E	SE	S	SW	W	NW	Mean Force.
A.M.			1		3	5	13	6	3	
P.M.			1	2	1	3	14	5	5	
Mean.			1	1	2	4	13	6	4	0

2.56

Observations made and  
Return verified by

William Macdonald

(Signed)

166







# SCOTTISH METEOROLOGICAL SOCIETY.

Observations taken at Inveresk, County of Edinburgh, in Lat. 55°56'0" Long 3°24'0" Distance from Sea 100 miles/  
Height of Cistern of the Barometer above Mean Sea-level 40 feet, above Ground 4 feet. During the MONTH of September 1874  
The Hours of Observation are of Greenwich Time.

ELECTRICITY.	Days of Month.	BAROMETER.				SELF-REGISTERING THERMOMETERS, Read Daily, at 9 P.M.				HYGROMETER. No. —				WIND.				RAIN.		CLOUDS.				THERMOMETERS under Ground.				SEA.	OZONE.	GENERAL REMARKS.	Days of Month.																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																															
		9 h. A.M.		9 h. P.M.		Protected in Shade, 4 feet above Ground.		Exposed Black Bulbs. Ground.		9 h. A.M.		9 h. P.M.		9 h. A.M.		9 h. P.M.		No. of hours in which it fell.	Amount in inches.	9 A.M.		P.M.		9 h. A.M.																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																						
		Barometer. * No.	Attach- ed Ther- mometer	Barometer. No.	Attach- ed Ther- mometer	Max. No.	Min. No.	Max. in Sun's rays No.	Min. on Grass. No.	Dry bulb.	Wet bulb.	Dry bulb.	Wet bulb.	Direction.	Force.	Direction.	Force.			Readings of the H. Cup Anemometer. No. —	9 h. A.M.	Velocity (0—5), and Direc- tion.	Amount (0—10), and Species.	Velocity (0—5), and Direc- tion.	Amount (0—10), and Species.	No. 8 inches.	12 inches.					No. 22 inches.																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																														
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BAROMETER, "corrected Mean" at 9 A.M., minus the Correction†† = 29.673  
for Temp. (Col. 2), = 29.760... 0.087...  
"Corrected Mean" of Barometer at 9 P.M., minus the Correction†† = 29.699  
for Temp. (Col. 4), = 29.779... 0.080...  
Mean at Station, corrected, and at 32°, = 29.681  
Correction for height, feet above Mean Sea-level, = 98  
Mean, reduced to 32°, and Sea-level, = 29.779  
Highest Reading, corrected for Index error, on the 13 th, = 30.280  
Lowest Do. Do. on the 10 th, = 29.210  
Difference, or Monthly Range, = 1.070

S.-R. THERMOMETER, (in shade, etc.), Highest in Month, (corrected for Index Errors), on the 1 th, = 66.0  
Lowest in Month, corrected for Index errors, on the 13 th, = 40.0  
Difference, or Monthly Range, = 26.0  
"Corrected Mean" of all the Highest, (Col. 5), = 59.7  
"Corrected Mean" of all the Lowest, (Col. 6), = 45.8  
Difference, or Mean Daily Range, = 13.9  
\*\* Calculated Mean Temperature of Month, = 52.8  
S.-R. THERMOMETER, Black Bulb in Sun, Highest, (corrected for Index Errors), on the th, =  
"Corrected Mean," (Col. 7), of Black Bulb, Max. in Sun, =  
Lowest at Night, Black Bulb, (corrected for Index errors), on the th, =  
"Corrected Mean," (Col. 8), of Black Bulb, Min. on grass, =  
Difference of above Means or Range ("exposed"), =

HYGROMETER, Mean (corrected) A.M. and P.M. Reading of Dry Bulb, (Cols. 9 and 11), = 52.9  
Mean (corrected) A.M. and P.M. Reading of Wet Bulb, (Cols. 10 and 12), = 51.4  
† Computed Temperature of Dew-Point, = 49.9  
† Do. Elastic Force of Vapour, = 3.61  
† Do. Weight of Vapour in a Cubic Foot of Air, = 90  
† Relative Humidity, (Saturation = 100), = 90  
RAIN fell on 4 Days; Amount in Inches, = 1.40  
WIND. SUMMARY.  
Direction. N NE E SE S SW W NW  
A.M. 1 1 1 14 11 1 1  
P.M. 1 1 12 12 1 2  
Mean. 1 1 00 14 11 1 2  
4.00

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

Observations made and Return verified by William McAlister

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







## SCOTTISH METEOROLOGICAL SOCIETY.

Observations taken at Inveresk, County of Edinburgh, in Lat 55°56'0" Long 3°2'40" Distance from Sea One miles)  
Height of Cistern of the Barometer above Mean Sea-level 90 feet, above Ground 4 feet. During the MONTH of October 1877  
The Hours of Observation are of Greenwich Time.

ELECTRICITY.	Days of Month.	BAROMETER.				SELF-REGISTERING THERMOMETERS. Read Daily, at 9 P.M.				HYGROMETER. No. —				WIND.				RAIN.		CLOUDS.				THERMOMETERS under Ground.			SEA.	OZONE.	GENERAL REMARKS.  As to occurrence of Thunder, Lightning, Storms, Hail, Meteors, Remarkable Depression or Elevation of Barometer, Prevalent Diseases, etc.  Mention the hour at which Storms, including Thunder and Lightning, began and ended.	Days of Month.																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																		
		9 h. A.M.		9 h. P.M.		Protected in Shade, 4 feet above Ground.		Exposed Black Bulbs.		9 h. A.M.		9 h. P.M.		9 h. A.M.		9 h. P.M.		Readings of the H. Cup Anemometer. No. —	No. of hours in which it fell.	Amount in inches.	9 A.M.		P.M.		SUNSHINE  Hours.	9 h. A.M.																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																						
		Barometer. * No. —	Atmospheric Thermometer No. —	Barometer. No. —	Atmospheric Thermometer No. —	Max. No. —	Min. No. —	Max. in Sun's rays No. —	Min. on Grass. No. —	Dry bulb. No. —	Wet bulb. No. —	Dry bulb. No. —	Wet bulb. No. —	Direction. No. —	Force. No. —	Direction. No. —	Force. No. —				Velocity (0—6). and Direction.	Amount (0—10). and Species.	Velocity (0—6). and Direction.	Amount (0—10). and Species.		No. — 3 inches.					12 inches.	No. — 22 inches.																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																
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BAROMETER, “corrected Mean” at 9 A.M., minus the Correction†† for Temp. (Col. 2), = 29.612  
“Corrected Mean” of Barometer at 9 P.M., minus the Correction†† for Temp. (Col. 4), = 29.609  
Mean at Station, corrected, and at 32°, = 29.610  
Correction for height, feet above Mean Sea-level, = 100  
Mean, reduced to 32°, and Sea-level, = 29.710  
Highest Reading, corrected for Index error, on the 50 th, = 30.480  
Lowest Do. Do., on the 2 th, = 28.700  
Difference, or Monthly Range, = 1.780

S.-R. THERMOMETER, (in shade, etc.), Highest in Month, (corrected for Index Errors), on the 15 th, = 62.0  
Lowest in Month, corrected for Index errors, on the 31 th, = 28.0  
Difference, or Monthly Range, = 34.0  
“Corrected Mean” of all the Highest, (Col. 5), = 52.5  
“Corrected Mean” of all the Lowest, (Col. 6), = 58.6  
Difference, or Mean Daily Range, = 13.9  
\*\* Calculated Mean Temperature of Month, = 45.6  
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), = 44.2  
Mean (corrected) A.M. and P.M. Reading of Wet Bulb, (Cols. 10 and 12), = 43.2  
†† Computed Temperature of Dew-Point, = 42.0  
†† Do. Elastic Force of Vapour, = 2.67  
†† Do. Weight of Vapour in a Cubic Foot of Air, =  
†† Relative Humidity, (Saturation = 100), = 92  
RAIN fell on 16 Days; Amount in Inches, = 2.73  
WIND. SUMMARY.  
Direction. N NE E SE S SW W NW  
A.M. 2 11 12 4 2  
P.M. 1 8 16 3 3  
Mean. 0 0 0 2 9 14 3 3 0 2.15  
4.62

Observations made and  
Return verified by

William McMurdo

(Signed)

430  
265  
109



WITH REMARKS ON THE USE OF INSTRUMENTS.

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

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

the error that would be introduced by this method. This form of instrument has been used for the measurement 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 tool, whose stem passes freely through the lid and case of the cistern. When the *index-line* on this little piston-rod is brought, by the adjusting screw, to *form one straight line* with those on its ivory frame, the surface of the mercury is then at the exact height from which the scale is graduated. In taking an observation, this *primary* setting must be made with scrupulous accuracy; a slight error here will vitiate the readings from the *vernier*.

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.

*Protection of Thermometers*—The Council of the Society recommend that Self-recording Thermometers and Hygrometers be enclosed in a Box, painted white outside and inside, 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 to form a 'protect' for the Thermometers, and to allow a complete ventilation of the interior. The instruments are suspended on cross-bars in the centre of the Box, and are protected from the north wind. The doors, which indicate the set of instruments, which is most desirable, must also be made to open to the south.

*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 as are *not* graduated on the stem, but merely on an attached scale, undergo repairs, they are very liable to be moved from their position on the Scale, and ought never afterwards to be used without being *re-tested*. The self-registering,

not necessarily, mounted on one frame. As apparently slight deviations from the approved and *well-tested form* of this ap-

neck of the bulb by the cotton, which also supplies it with water. It must be seen to by the observer that the muslin is always *clean* and *moist*, and the water pure. In frosty weather

*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 40¾°, more or less must be registered 40°·5 and 40°·75, and 40°·7 and 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.

Careful observations ought to be made on the changes in the direction of the wind ; and during storms, extra observations

*Estimating 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 unfavorable situation for observation and partly from the defective nature of the instruments used. It is indeed difficult to obtain an unexpected position for the gauge, or to get it on a level with the ground surface; and the greatest difficulties are experienced in close cut grass around its mouth. The rain-gauge ought to be placed at least 10 ft. from the building, and the readings entered in the diary at 9 A.M., and the wetness noted.

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 6, S. W." (for example,) will indicate that the "and Direction,"

column, an entry of  $\frac{2}{2}$ , (*c.f.*) 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.

observations in this interesting department he made at 9 A.M., by thermometers placed in the earth, their bulbs being sunk to depths of 12, 18, and 22 inches, and the stems above ground protected from the sun's rays, and fitted with slugs in collars, to prevent rain water being conveyed to the bulbs by the stems or wooden frames. Mention should be made of the geological formation and agricultural condition of the soil in which these thermometers are placed.

therefore recommend that the temperature of the sea be carefully taken by a properly constructed apparatus, from boats, 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 thermo-

*On the Zone.*—Mention whether Schimper's or Moffat's apparatus is 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 S.E., as an *exempli gratia* in the schedule, will indicate that the ozone paper is entirely in  $43^{\circ}$  on the scale, that the force is from the N.W., and that its force on the scale is 0.6 to 4.4; i.e., that it is *blowing fresh*.

*Remarks.*—The “*Remarks*” column is too narrow, but unavoidable 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 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,

By the use of abbreviations, the state of the weather at 9 A.M. and 9 P.M. should be registered, either in two columns, otherwise 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.

The Council recommend that *tern* day observations be taken, —viz., on the 21st days of March, June, September, and December.

(By Order) A. B.

EDINBURGH, November 18<sup>th</sup>.

(By Order) A. B.

OBSERVATIONS IN CONNECTION WITH THE PERIODICAL RETURN OF THE SEASONS.

[illegible]

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

BOOK POST.

Mr ALEXANDER BUCHAN

*Secretary of the Meteorological Society of Scotland.*

EDINBURGH.

Siverek  
Oct. 1874-



# SCOTTISH METEOROLOGICAL SOCIETY.

Observations taken at Inverness, County of Highland, in Lat. 55° 56' 0" N Long. 3° 2' 40" W Distance from Sea One miles.

Height of Cistern of the Barometer above Mean Sea-level 970 feet, above Ground 4 feet.

During the MONTH of November 1874.

The Hours of Observation are of Greenwich Time.

ELECTRICITY.	Days of Month.	BAROMETER.				SELF-REGISTERING THERMOMETERS. Read Daily, at 9 P.M.				HYGROMETER. No. —				WIND.				RAIN.		CLOUDS.				THERMOMETERS under Ground.				SEA.	OZONE.	GENERAL REMARKS.		Days of Month.		
		9 h. A.M.		9 h. P.M.		Protected in Shade 4 feet above Ground.		Exposed Black Bulbs.		9 h. A.M.		9 h. P.M.		9 h. A.M.		9 h. P.M.		9 A.M.		P.M.		9 h. A.M.		Temperature of WELL at depth of feet. No.	Temperature at 1 foot from wall. Daily.	9 A.M.	9 P.M.							
		Barometer.	Atmospheric.	Barometer.	Atmospheric.	Max.	Min.	Max. in Sun's rays.	Min. on Grass.	Dry bulb.	Wet bulb.	Dry bulb.	Wet bulb.	Direction.	Force.	Direction.	Force.	Velocity (0—10), and Direction.	Amount (0—10), and Species.	Velocity (0—10), and Direction.	Amount (0—10), and Species.	No.	12 inches.										No.	22 inches.
		* No.	inches.	°	inches.	°	No.	No.	No.	No.	°	°	°	°									°										°	°
1	30.36	50	30.30	55	44	38			36	36	40	40	S	1	S	1														1				
2	30.14	51	29.93	56	47	41			44	44	44	44	SE	2	SW	1														2				
3	29.92	52	29.90	56	52	37	Punch 37		43	44	50	50	SW	1	SW	3														3				
4	29.93	58	29.94	56	56	47			54	53	52	52	SW	2	SW	1														4				
5	29.94	59	30.05	55	56	36			54	53	44	44	SW	2	SW	2														5				
6	30.20	56	30.24	55	50	36			40	40	42	41	S	2	SW	1														6				
7	30.26	64	30.34	55	49	34	Punch 37		40	39	46	43	SW	1	SW	1														7				
8	30.34	54	30.34	56	54	48			47	45	50	47	SW	3	SW	2														8				
9	30.25	56	29.90	57	58	35			54	50	38	37	SW	1	SW	4														9				
10	30.13	63	30.20	55	41	27			36	34	32	31	SW	2	SW	1														10				
11	30.15	50	30.16	52	40	28			32	31	29	29	SW	1	SW	1														11				
12	30.17	50	29.93	50	40	33	Punch 28		29	29	34	33	SW	1	SW	1														12				
13	30.03	46	30.16	52	46	35			34	33	36	36	SW	1	SW	1														13				
14	30.15	49	30.06	52	42	35	Punch 35		36	36	43	44	W	1	W	1														14				
15	29.80	52	29.55	53	43	33			43	42	38	37	SW	1	SW	2														15				
16	29.56	47	29.45	54	44	34			38	37	38	37	SW	1	SW	1														16				
17	29.74	49	29.84	54	43	35			37	37	39	39	W	1	W	1														17				
18	29.72	50	29.63	51	44	35			36	36	37	37	S	1	SW	1														18				
19	29.55	50	29.70	53	44	35			38	38	40	40	SW	1	SW	1														19				
20	29.72	49	30.10	51	44	34			38	37	38	38	SW	1	SW	1														20				
21	30.20	48	30.20	50	44	26			38	37	30	30	W	1	W	1														21				
22	30.10	44	30.08	50	43	24			30	30	26	26	SE	1	SE	1														22				
23	30.10	43	30.13	49	37	32			27	27	34	34	SE	1	SE	1														23				
24	30.12	45	29.93	48	40	38	Punch 33		35	35	36	36	S	1	SE	1														24				
25	29.80	46	29.68	49	40	36			40	40	41	41	SW	1	SW	2														25				
26	29.72	48	29.66	51	43	30			38	38	36	33	SW	1	SE	1														26				
27	29.63	45	29.65	48	34	29			32	32	30	30	S	1	S	1														27				
28	29.60	40	29.30	48	38	33	Punch 28		30	30	34	34	S	1	S	1														28				
29	28.84	44	28.68	48	37	33			36	36	36	36	E	1	E	5														29				
30	28.88	46	29.13	47	37	35			36	36	36	35	SE	3	SE	3														30				
31																														31				
Sums.	149	2725	141	2626	66	145	123		14	253	13	251	238	42	45		2	369																
Means.	29.908	49.5	29.875	52	244	34.1			38.8	37.8	38.4	38.0	1.4	1.5																				
+ Total Corrections for Instru- mental Errors.																																		
+ Corre- ctions for Diurnal Range.																																		
"Cor- rected Means."																																		
No. of Column.	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30				

BAROMETER, "corrected Mean" at 9 A.M., minus the Correction†† for Temp. (Col. 2), = 29.908 - 0.056 = 29.852  
 "Corrected Mean" of Barometer at 9 P.M., minus the Correction†† for Temp. (Col. 4), = 29.875 - 0.064 = 29.811  
 Mean at Station, corrected, and at 32°, = 29.832  
 Correction for height, feet above Mean Sea-level, = 101  
 Mean, reduced to 32°, and Sea-level, = 29.933  
 Highest Reading, corrected for Index error, on the 1<sup>st</sup> th, = 30.360  
 Lowest Do. Do., on the 29<sup>th</sup> th, = 28.680  
 Difference, or Monthly Range, = 1.680

S.-R. THERMOMETER, (in shade, etc.), Highest in Month, (corrected for Index Errors), on the 4<sup>th</sup>, = 58.0  
 Lowest in Month, corrected for Index errors, on the 22<sup>nd</sup>, = 24.0  
 Difference, or Monthly Range, = 34.0  
 "Corrected Mean" of all the Highest, (Col. 5), = 44.8  
 "Corrected Mean" of all the Lowest, (Col. 6), = 34.1  
 Difference, or Mean Daily Range, = 10.7  
 \*\* Calculated Mean Temperature of Month, = 39.4  
 S.-R. THERMOMETER, Black Bulb in Sun, Highest, (corrected for Index Errors), on the 4<sup>th</sup>, = 58.0  
 "Corrected Mean," (Col. 7), of Black Bulb, Max. in Sun, = 44.8  
 Lowest at Night, Black Bulb, (corrected for Index errors), on the 22<sup>nd</sup>, = 24.0  
 "Corrected Mean," (Col. 8), of Black Bulb, Min. on grass, = 34.1  
 Difference of above Means or Range ("exposed"), = 10.7

HYGROMETER, Mean (corrected) A.M. and P.M. Reading of Dry Bulb, (Cols. 9 and 11), = 38.6  
 Mean (corrected) A.M. and P.M. Reading of Wet Bulb, (Cols. 10 and 12), = 37.9  
 †† Computed Temperature of Dew-Point, = 37.0  
 Do. Elastic Force of Vapour, = .221  
 Do. Weight of Vapour in a Cubic Foot of Air, = .95  
 †† Relative Humidity, (Saturation = 100), = 95  
 RAIN fell on 13 Days; Amount in Inches, = 3.69

WIND.		SUMMARY.									
Direction.	N	NE	E	SE	S	SW	W	NW	Calm or Variable.	Mean Force.	Mean Velocity in miles per day.
A.M.	1	2	2	1	7	8	7	2			
P.M.	2	1	4	7	10	4	2				
Mean.	1	2	3	1	7	9	5	2	0		

Observations made and Return verified by William McAlister

(Signed)

145  
580







## SCOTTISH METEOROLOGICAL SOCIETY.

Observations taken at Inverness, County of Edinburgh, in Lat 55° 56' 0" N Long. 3° 2' 10" W Distance from Sea one miles.  
Height of Cistern of the Barometer above Mean Sea-level 90 feet, above Ground 4 feet. During the MONTH of December 1875.  
The Hours of Observation are of Greenwich Time.

ELECTRICITY.	Days of Month.	BAROMETER.				SELF-REGISTERING THERMOMETERS. Read Daily, at 9 P.M.				HYGROMETER. No.				WIND.				RAIN.		CLOUDS.				THERMOMETERS under Ground.			SEA.	OZONE.	GENERAL REMARKS.  As to occurrence of Thunder, Lightning, Storms, Hail, Meteors, Remarkable Depression or Elevation of Barometer, Prevalent Diseases, etc.  Mention the hour at which Storms, including Thunder and Lightning, began and ended.		Days of Month.			
		9 h. A.M.		9 h. P.M.		Protected in Shade, 4 feet above Ground.		Exposed Black Bulbs.		9 h. A.M.		9 h. P.M.		9 h. A.M.		9 h. P.M.		No. of hours in which it fell.	Amount in inches.	9 A.M.		P.M.		9 h. A.M.										
		Barometer.	Atta- ched Ther- mometer	Barometer.	Atta- ched Ther- mometer	Max.	Min.	Max.	Min.	Dry bulb.	Wet bulb.	Dry bulb.	Wet bulb.	Direction.	Force.	Direction.	Force.			Velocity (0—6), and Direction.	Amount (0—10), and Species.	Velocity (0—6), and Direction.	Amount (0—10), and Species.	No.	3 inches.	12 inches.						No.	22 inches.	
		* No.		No.		No.	No.	No.	No.																	Hours.								
		inches.	°	inches.	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	
	1	29.46	44	29.77	56	40	28			34	34	29	29	NE	1	N	1																	
	2	29.74	44	29.99	53	38	24			28	28	26	26	N	1	N	2																	
	3	29.73	44	30.06	46	38	31			34	34	34	33	SW	2	SW	2																	
	4	29.80	48	29.50	48	44	37			37	36	40	40	SW	4	SW	3																	
	5	29.44	47	29.34	50	48	31			40	39	34	34	SW	2	W	4																	
	6	29.28	46	29.38	46	36	29			33	33	34	34	W	1	W	2																	
	7	29.50	44	29.82	53	38	27			32	32	29	29	W	3	W	2																	
	8	29.56	43	29	54	38	31			32	31	33	33	ENE	1	ENE	3																	
	9	29.33	43	29.62	50	36	21			32	32	28	28	NE	1	NE	1																	
	10	29.72	40	29.32	42	28	26			22	22	27	27	SE	1	S	1																	
	11	28.73	40	28.73	42	33	30			31	31	33	33	SE	3	SE	2																	
	12	29.26	43	29.54	43	33	30			34	34	32	32	ENE	1	ENE	1																	
	13	29.80	41	29.98	44	34	30			32	22	30	30	N	1	N	2																	
	14	30.14	42	30.20	42	34	18			33	33	26	26	N	1	N	1																	
	15	30.14	38	29.74	42	30	17			18	18	29	29	NE	1	SE	1																	
	16	29.98	40	30.14	43	33	23			27	27	28	28	SE	1	ENE	1																	
	17	30.38	40	30.38	40	34	24			30	30	27	27	N	2	ENE	1																	
	18	30.24	41	29.70	44	40	29			33	34	33	33	SW	4	SW	3																	
	19	29.94	41	29.74	45	33	29			29	29	31	30	N	1	N	1																	
	20	29.61	42	29.60	45	36	28			32	31	32	32	SW	1	SW	3																	
	21	29.55	41	29.70	44	33	21			30	30	26	26	NE	1	ENE	1																	
	22	29.85	40	29.98	43	29	19			29	29	20	20	ENE	1	ENE	1																	
	23	29.93	40	29.78	46	28	19			23	23	22	22	S	1	S	1																	
	24	29.60	40	29.70	44	26	17			26	26	21	21	S	1	S	1																	
	25	29.76	40	29.81	50	27	21			18	18	26	26	SW	1	SW	1																	
	26	29.92	43	30.14	44	26	19			23	23	20	20	W	1	W	1																	
	27	30.20	41	30.21	53	29	16			21	21	20	20	W	1	S	1																	
	28	30.26	47	30.28	54	30	10			20	20	19	19	S	1	S	1																	
	29	30.30	38	30.36	47	29	15			11	11	28	28	SE	1	SE	1																	
	30	30.42	40	30.35	47	29	30			16	16	21	21	S	1	S	1																	
	31	30.28	41	30.25	43	31	9			28	28	10	10	SE	1	S	1																	
	Sums.	1712	18	1612	11	16	15			252	237	227	225		46	52																		
	Means.	29.810	452	29.823	466	33.8	22.1			28.1	27.6	27.3	27.2		1.48	1.68																		
	† Total Corrections for Instrumental Errors.																																	
	‡ Corrections for Diurnal Range.																																	
	“Corrected Means.”																																	
	No. of Column.	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30			

BAROMETER, “corrected Mean” at 9 A.M., minus the Correction†† = 29.765  
for Temp. (Col. 2), = 29.810 — 0.045 = 29.765  
“Corrected Mean” of Barometer at 9 P.M., minus the Correction†† = 29.775  
for Temp. (Col. 4), = 29.823 — 0.048 = 29.775  
Mean at Station, corrected, and at 32°, = 29.770  
Correction for height, feet above Mean Sea-level, = 103  
Mean, reduced to 32°, and Sea-level, = 29.873  
Highest Reading, corrected for Index error, on the 30th, = 30.420  
Lowest Do. Do., on the 11th, = 28.750  
Difference, or Monthly Range, = 1.670

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

S.-R. THERMOMETER, (in shade, etc.), Highest in Month, (corrected for Index Errors), on the 11th, = 48.0  
Lowest in Month, corrected for Index errors, on the 31st, = 9.0  
Difference, or Monthly Range, = 39.0  
“Corrected Mean” of all the Highest, (Col. 5), = 33.8  
“Corrected Mean” of all the Lowest, (Col. 6), = 22.1  
Difference, or Mean Daily Range, = 11.7  
\*\* Calculated Mean Temperature of Month, = 28.0

S.-R. THERMOMETER, Black Bulb in Sun, Highest, (corrected for Index Errors), on the 11th, = 58.0  
“Corrected Mean,” (Col. 7), of Black Bulb, Max. in Sun, = 58.0  
Lowest at Night, Black Bulb, (corrected for Index errors), on the 11th, = 58.0  
“Corrected Mean,” (Col. 8), of Black Bulb, Min. on grass, = 58.0  
Difference of above Means or Range (“exposed”), = 58.0

HYGROMETER, Mean (corrected) A.M. and P.M. Reading of Dry Bulb, (Cols. 9 and 11), = 27.7  
Mean (corrected) A.M. and P.M. Reading of Wet Bulb, (Cols. 10 and 12), = 27.4  
† Computed Temperature of Dew-Point, = 26.2  
† Do. Elastic Force of Vapour, = 1.42  
† Do. Weight of Vapour in a Cubic Foot of Air, = 93  
† Relative Humidity, (Saturation = 100), = 93  
RAIN fell on 14 Days; Amount in Inches, = 2.53

WIND.		SUMMARY.							
Direction.		N	NE	E	SE	S	SW	W	NW
A.M.		4	3	4	5	5	4	1	
P.M.		8	2	1	2	8	5	1	
Mean.		6	3	2	3	6	5	5	1

Observations made and  
Return verified by

William Macdonald

(Signed)

158  
722



Goresh  
Dec. 1874-

BOOK POST.

Mr ALEXANDER BUCHAN,

*Secretary of the Meteorological Society of Scotland,*

EDINBURGH.

[illegible]

EDINBURGH, December 18<sup>th</sup> 4.

Barberry	Black Currant,	Apple,	First in	Shrubs, etc.
Bourtree or Elder,	Cherry,	Black Currant,	Blossom.	
Broom,	Gram,	Cherry,		
Hawthorn,	Roseberry,	Black Currant,		
Holly,	Pear,	Black Currant,		
Laburnum,	Plum,	Black Currant,		
Lilac,	Strawberry,	Black Currant,		
Mazeton,		Black Currant,		
Mountain Ash or Rowan,		Black Currant,		
Red Flowering Currant,		Black Currant,		
Rhododendron Ponticum,		Black Currant,		
Whin,		Black Currant,		

OBSERVATIONS IN CONNECTION WITH THE PERIODICAL RETURN OF THE SEASONS.

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

is an air in the tube, which is liable to be damaged by the introduction of air into their tubes, or a removal from places to places, or in being roughly handled, it may be useful to Observers to know how the ivory may be repaired. First close up the stem by sawing the ivory as it is explained. Next the escape of mercury; then screw up the ivory tightly, so as to puff on each from the top of the tube; and having mercury to mount the instrument, place the top of it on a yielding substance such as the book, and gently tap on the stem with the palm of the hand, so as to induce the air to ascend through the column to the cistern, where—where it may escape. Since there is the weight of two or three air outside—pressing on any air that may be inside the tube, it is usually a tedious operation to get it violently expelled. The above repeated trials, however, is generally accomplished, and the clear metallic sound of the ivory when gently struck against the top of the glass tube, will allow when the vitality of the air has been expelled. On hanging up the Barometer, care must be taken to screw down the mercury in the tube before unfixing the instrument to safety, for if this be not attended to, the mercury will be lost to the observer, and the instrument be seriously damaged.