

Observations taken at Braman, County of Abbeville, in Lat. 37° 14', Long. 81° 24', Distance from Sea 60 miles.
Height of Cistern of the Barometer above Mean Sea-level 1114 feet, above Ground 3 feet. During the MONTH of December 1872.
The Hours of Observation are of Greenwich Time.

BAROMETER, "corrected Mean" at 9 A.M., minus the Correction \uparrow)	=	<u>28.145</u>
for Temp. (Col. 2), = <u>28.161</u> ... - <u>.016</u>		
"Corrected Mean" of Barometer at 9 P.M., minus the Correction \uparrow)	=	<u>28.155</u>
for Temp. (Col. 4), = <u>28.175</u> ... - <u>.020</u>		
Mean at Station, corrected, and at 32°,.....	=	<u>28.150</u>
Correction for height, feet above Mean Sea-level,.....	=	<u>1.202</u>
Mean, reduced to 32°, and Sea-level,.....	=	<u>29.352</u>
Highest Reading, corrected for Index error, on the <u>9</u> th,.....	=	<u>28.762</u>
Lowest Do. Do., on the <u>18</u> th,.....	=	<u>27.050</u>
Difference, or Monthly Range ,.....	=	<u>1.712</u>

S.-R. THERMOMETER , (in shade, etc.), Highest in Month , (corrected for Index Errors), on the 30 th.....	= 48.2 ✓
Lowest in Month , corrected for Index errors, on the 8 th,	= 18.2 ✓
Difference, or Monthly Range ,	= 30.0 ✓
"Corrected Mean " of all the Highest , (Col. 5),	= 40.4 ✓
"Corrected Mean " of all the Lowest , (Col. 6),	= 31.4 ✓
Difference, or Mean Daily Range ,	= 9.0 ✓
* ⁸ Calculated Mean Temperature of Month,	= 35.9 ✓
S.-R. THERMOMETER , Black Bulb in Sun , Highest , (corrected for Index Errors), on the 20 th.....	= 66.2 ✓
"Corrected Mean ," (Col. 7), of Black Bulb , Max. in Sun ,	= 46.8 ✓
Lowest at Night , Black Bulb , (corrected for Index errors), on the 8 th, ...	= 14.3 ✓
"Corrected Mean ," (Col. 8), of Black Bulb , Min. on grass,	= 29.4 ✓
Difference of above Means or Range ("exposed"),	= 17.4

HYGROMETER, Mean (corrected) A.M. and P.M. Reading of Dry Bulb , (Cols. 9 and 11),	=	35.6	✓
Mean (corrected) A.M. and P.M. Reading of Wet Bulb , (Cols. 10 and 12),	=	34.8	✓
‡ Computed Temperature of Dew-Point ,	=	33.6	✓
‡ Do. Elastic Force of Vapour ,	=	19.3	✓
‡ Do. Weight of Vapour in a Cubic Foot of Air , ... =			
‡ Relative Humidity , (Saturation = 100),	=	93	✓
RAIN fell on 20 Days; Amount in Inches ,	=	6.40	✓

WIND.		SUMMARY.									
Direction.	N	NE	E	SE	S	SW	W	NW	Calcu or Variable.	Mean Force.	Mean Velocity in miles per day
A.M.	1	1	2	1	8	14	3	1	0	0.83	
P.M.	0	2	1	2	3	21	1	1	0	0.87	
Mean.	0	2	1	2	5	18	2	1	0	0.85	0.72

Observations made and
Return verified by

SCOTTISH METEOROLOGICAL SOCIETY.

Observations taken at Braemar, County of Aberdeen, in Lat. 57° N., Long. 2° 24' W., Distance from Sea 60 miles.Height of Cistern of the Barometer above Mean Sea-level 1114 feet, above Ground 3 feet.During the MONTH of February 1872.

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.				SUNSHINE.	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. Max. in Sun-rays. Min. on Grass.		9 h. A.M.		9 h. P.M.		9 h. A.M.		9 h. P.M.			9 h. A.M.		9 h. P.M.			9 h. A.M.								
		Barometer. No.	Attached Thermometer No.	Barometer. No.	Attached Thermometer No.	Max. No.	Min. No.	Max. No.	Min. No.	Dry bulb.	Wet bulb.	Dry bulb.	Wet bulb.	Direction.	Force.	Direction.	Force.		Amount (0-10), and Species.	Amount (0-10), and Species.	Amount (0-10), and Species.	Amount (0-10), and Species.		No. 4 inches.	No. 12 inches.	No. 22 inches.						
		inches.		inches.																												
	1	27.664		28.200		47.3	59.8	48.2	58.0	46.0	45.0	42.0	42.0	SW	5	S	2	0.50	10	2											1	
	2	28.116		28.350		44.2	58.7	58.2	55.7	55.5	56.7	40.0	40.3	S	0.5	S	1	0.10	7	5											2	
	3	28.522		28.450		42.0	58.3	42.3	56.0	50.0	58.0	39.9	38.0	SW	1.5	S	1.5	0.50	8	10											3	
	4	28.566		28.570		41.4	55.3	51.2	53.1	58.0	56.7	58.3	46.8	S	2.0	SE	0.5	1.12	10	8											4	
	5	28.464		28.550		45.0	55.7	50.5	53.7	56.8	56.4	57.0	53.3	N	1.0	SW	0.5	1.12	10	8											5	
	6	28.548		28.558		44.7	54.8	49.7	53.0	58.1	59.8	57.8	56.7	S	1.0	SE	0.5	1.12	10	8												6
	7	28.600		28.600		39.7	55.7	54.7	59.1	54.9	54.3	51.0	50.9	N	1.5	NE	0.5	1.12	10	8												7
25.0	8	28.716		28.666		41.8	55.0	46.3	52.3	53.0	53.0	53.9	52.8	SW	0	SW	0	1.12	10	8												8
	9	28.600		28.500		44.8	55.7	55.7	52.7	58.2	57.4	47.7	41.9	SE	0.5	SW	0.5	0.56	10	8												9
	10	28.500		28.500		45.7	40.0	52.1	52.3	48.0	42.6	45.0	44.0	SW	0.5	SW	1.5	0.23	10	8												10
	11	28.576		28.574		45.1	37.8	50.0	52.0	49.0	48.0	42.3	42.0	SW	0.5	SE	0	0.20	10	8												11
	12	28.550		28.580		44.3	35.6	45.7	52.3	47.8	41.6	36.8	36.0	SE	1.5	N	1.5	0.10	10	8												12
	13	28.582		28.576		42.8	34.9	47.0	52.7	47.7	47.0	36.0	35.7	SE	0.5	NE	0.5	0.02	10	8												13
	14	28.650		28.560		45.7	35.0	50.3	53.8	36.3	35.7	40.0	39.5	N	0	NE	0	1.12	10	8												14
	15	28.626		28.550		41.2	35.0	49.7	54.7	36.5	36.0	36.7	36.0	SE	0.5	NE	0.5	1.12	10	8												15
	16	28.500		28.550		39.7	35.0	50.3	52.6	36.0	35.1	35.2	34.8	SE	1.0	SE	1.5	1.12	10	8												16
	17	28.250		28.300		39.6	35.1	49.8	52.8	35.9	35.0	35.7	32.8	SW	2.0	SE	1.5	0.50	10	8												17
	18	28.132		28.204		40.1	34.3	50.0	50.3	35.1	32.7	35.2	32.7	SW	1.5	SE	0.5	1.12	10	8												18
	19	28.316		28.268		41.7	34.9	49.8	51.7	34.7	35.8	34.0	35.5	SW	0.5	S	1.5	1.12	10	8												19
	20	28.400		28.408		41.9	34.3	53.1	53.8	35.0	35.0	34.2	33.9	SW	1.0	SW	0.5	1.12	10	8												20
	21	28.550		28.654		41.8	35.5	60.7	59.5	36.0	35.3	35.7	35.0	SW	0.5	SW	0	1.12	10	8												21
	22	28.700		28.656		45.7	35.0	59.8	50.5	35.0	32.7	35.0	34.9	SW	0.5	SW	0	0.11	10	8												22
	23	28.500		28.476		41.8	30.3	70.2	72.3	30.3	30.0	30.0	30.0	SW	0.5	SW	0	1.12	10	8												23
	24	28.400		28.392		40.0	25.6	50.9	52.3	35.0	34.7	34.4	32.9	SW	1.0	SW	0.5	1.12	10	8												24
	25	28.300		28.456		40.0	27.8	49.0	50.0	39.0	38.6	38.7	38.0	SW	1.5	SW	1.5	0.73	10	8												25
	26	28.650		28.580		40.0	25.7	50.0	51.3	35.8	35.4	35.7	34.3	SE	1.5	SE	1.5	1.59	10	8												26
	27	28.900		28.956		43.2	26.0	56.2	52.0	32.0	31.9	31.7	35.0	S	0	SE	0.5	1.12	10	8												27
29.0	28	28.650		28.576		48.3	27.0	60.9	58.7	34.2	33.7	35.0	34.3	SE	1.0	SW	0.5	1.12	10	8												28
28.3	29	28.100		28.328		49.2	28.3	61.8	50.7	44.9	46.0	37.2	37.0	SW	1.0	SW	0.5	1.12	10	8												29
	30																															30
	31																															31
	Sums.	13538		13968		827	992	765	2840	1909	1719	1786	1568	253	220			6.26	222	222												
	Means.	28467		28482		428	334	526	795	366	359	362	354	83	76			7.7	7.7													
	† Total Corrections for Instrumental Errors.	-0.009		-0.009																												
	† Corrections for Diurnal Range.																															
	“Corrected Means.”	28458		28473																												
	No. of Column.	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	

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

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

NOTATION USED IN GENERAL REMARKS.

a.	denotes aurora.	m.	denotes meteor.
ci.	cirrus.	ms.	meteors.
ci-cu.	cirro-cumulus.	n.	nebula.
cu-s.	cumulo-stratus.	r.	rain.
cu.	cumulus.	h. r.	heavy rain.
cu-s.	cumulo-stratus.	c. h. r.	continued heavy rain.
d.	dew.	s.	stratus.
f.	fog.	sc.	scud.
fr.	frost.	sl.	sleet.
h. fr.	hoar-frost.	su.	sun.
h.	haze.	sc. ha.	solar halo.
h. d.	heavy dew.	sq.	squall.
h. l.	hail.	sq. s.	squalls.
l.	lightning.	t.	thunder.
li. cl.	light clouds.	t. s.	thunder storm.
li. sh.	light showers.	w.	wind.
li. co.	lunar corona.	w.	wind.
li. ha.	lunar halo.	g.	gale of wind.

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†† = 28.438
for Temp. (Col. 2), = 28.448“Corrected Mean” of Barometer at 9 P.M., minus the Correction†† = 28.453
for Temp. (Col. 4), = 28.473

Mean at Station, corrected, and at 32°, = 28.446

Correction for height, feet above Mean Sea-level, = 1.202

Mean, reduced to 32°, and Sea-level, = 29.648

Highest Reading, corrected for Index error, on the 27th, = 28.956

Lowest Do. Do. on the 1st, = 27.964

Difference, or Monthly Range, = 0.992

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

Index Errors), on the 27th, = 49.2

Lowest in Month, corrected for Index errors, on the 8th, = 25.0

Difference, or Monthly Range, = 24.2

“Corrected Mean” of all the Highest, (Col. 5), = 42.8

“Corrected Mean” of all the Lowest, (Col. 6), = 33.4

Difference, or Mean Daily Range, = 9.4

* Calculated Mean Temperature of Month, = 38.1

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

Index Errors), on the 23rd, = 70.2

“Corrected Mean,” (Col. 7), of Black Bulb, Max. in Sun, = 52.6

Lowest at Night, Black Bulb, (corrected for Index errors), on the 24th, = 20.2

“Corrected Mean,” (Col. 8), of Black Bulb, Min. on grass, = 29.8

Difference of above Means or Range (“exposed”), = 29.8

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

Bulb, (Cols. 9 and 11), = 3.64

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

10 and 12), = 3.56

†† Computed Temperature of Dew-Point, = 34.5

†† Do. Elastic Force of Vapour, = 2.00

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

†† Relative Humidity, (Saturation = 100), = 93

RAIN fell on 13 Days; Amount in Inches, = 6.16

WIND.	SUMMARY.											
	Direction.	S	NE	E	SE	S	SW	W	NW	Calm or Variable.	Mean Force.	Mean Velocity in miles per day.
A.M.	4	2	0	4	4	14	0	1	0		.88	
P.M.	1	5	0	7	4	12	0	0	0		.76	
Total.	2	4	0	6	4	13	0	0	0		.82	= 0.67 ²⁵⁵

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 incomprehensible, may arise from dissimilarity in the position or shelter of instruments, different hours of observation, or even from the use of differently constructed instruments. It is therefore hoped, that those persons who kindly furnish Reports to the Society will by a scrupulous attention to the following Directions, secure for their Monthly Returns, an accuracy and value commensurate with the labour and pains involved in making them; and, for the Table 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.

How 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. Aitch 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, 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 the *float* lies on this little piston-rod is brought by the adjusting screw, to *form one straight line* with those of the ivory fining the surface of the mercury, 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 *centre*.

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

The Barometer should be suspended in a good *loftly*, 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 faced 4 feet above grass in an exposed position, free from noxious 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 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 opticians *Self-registering Thermometers*.—Professor Phillips, 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 Kithleyford is recommended when graduated on the glass stem and attached to a frame separate from the *Maximum*. This Thermometer is liable to two derangements, both of which must be guarded against, and may be easily remedied by an observer. When the *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 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 in contact with the body of the liquid. These instruments should be hung horizontally.

The above remarks apply equally to the Thermometers for registering the greatest heat from the sun's rays, and the least

from radiation during night. Their bulbs have a black coating, which may easily be made, or mended, by the application of a mixture of lamp black and printer's ink. They are placed in shallow blackened boxes, whose sides protect the bulbs from the sun, and the *Minimum* should be freely exposed to the sun, and 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, undergoing repairs, they are very liable to be moved from their position on the scale, and ought never afterwards to be used, *Minimum* Thermometers ought frequently and especially the *Maximum* Thermometers, to be compared with the dry bulb of the Hygrometer. The self-registering point of each Thermometer (marked by a scratch on the tube) ought to be used 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 bulb;—the mast 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 mast is always *clean* and *moist*, and the water pure. In frosty weather observation is a matter of much delicacy, and must be made with great care. The bulb must be moistened by immersion from 15 to 30 minutes before the hour of observation. From the film of ice thus formed evaporation will proceed as from the moist cloth in ordinary circumstances.

One form of *Maximum* 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—38.3, 40.5, or 40.1; or again, 40.4, 40.5, or 40.6, according as it indicates a *fine* index; an exact coincidence with, or a little over 40, or 40.5, respectively. So also 40.3, and 40.7, or 40.8 respectively. In reading Kithleyford's *Hygrometer*, and *Hygrometer*, the reading ought to be taken to tenths of a degree—38.3, 40.5, or 40.1; or again, 40.4, 40.5, or 40.6, according as it indicates a *fine* index; an exact coincidence with, or a little over 40, or 40.5, respectively. So also 40.3, and 40.7, or 40.8 respectively. In reading Kithleyford's *Hygrometer*, and *Hygrometer*, the reading ought to be taken to tenths of a degree—38.3, 40.5, or 40.1; or again, 40.4, 40.5, or 40.6, according as it indicates a *fine* index; an exact coincidence with, or a little over 40, or 40.5, respectively. So also 40.3, and 40.7, or 40.8 respectively. In reading Kithleyford's *Hygrometer*, and *Hygrometer*, the reading ought to be taken to tenths of a degree—38.3, 40.5, or 40.1; or again, 40.4, 40.5, or 40.6, according as it indicates a *fine* index; an exact coincidence with, or a little over 40, or 40.5, respectively. So also 40.3, and 40.7, or 40.8 respectively. In reading Kithleyford's *Hygrometer*, and *Hygrometer*, the reading ought to be taken to tenths of a degree—38.3, 40.5, or 40.1; or again, 40.4, 40.5, or 40.6, according as it indicates a *fine* index; an exact coincidence with, or a little over 40, or 40.5, respectively. So also 40.3, and 40.7, or 40.8 respectively. In reading Kithleyford's *Hygrometer*, and *Hygrometer*, the reading ought to be taken to tenths of a degree—38.3, 40.5, or 40.1; or again, 40.4, 40.5, or 40.6, according as it indicates a *fine* index; an exact coincidence with, or a little over 40, or 40.5, respectively. So also 40.3, and 40.7, or 40.8 respectively. In reading Kithleyford's *Hygrometer*, and *Hygrometer*, the reading ought to be taken to tenths of a degree—38.3, 40.5, or 40.1; or again, 40.4, 40.5, or 40.6, according as it indicates a *fine* index; an exact coincidence with, or a little over 40, or 40.5, respectively. So also 40.3, and 40.7, or 40.8 respectively. In reading Kithleyford's *Hygrometer*, and *Hygrometer*, the reading ought to be taken to tenths of a degree—38.3, 40.5, or 40.1; or again, 40.4, 40.5, or 40.6, according as it indicates a *fine* index; an exact coincidence with, or a little over 40, or 40.5, respectively. So also 40.3, and 40.7, or 40.8 respectively. In reading Kithleyford's *Hygrometer*, and *Hygrometer*, the reading ought to be taken to tenths of a degree—38.3, 40.5, or 40.1; or again, 40.4, 40.5, or 40.6, according as it indicates a *fine* index; an exact coincidence with, or a little over 40, or 40.5, respectively. So also 40.3, and 40.7, or 40.8 respectively. In reading Kithleyford's *Hygrometer*, and *Hygrometer*, the reading ought to be taken to tenths of a degree—38.3, 40.5, or 40.1; or again, 40.4, 40.5, or 40.6, according as it indicates a *fine* index; an exact coincidence with, or a little over 40, or 40.5, respectively. So also 40.3, and 40.7, or 40.8 respectively. In reading Kithleyford's *Hygrometer*, and *Hygrometer*, the reading ought to be taken to tenths of a degree—38.3, 40.5, or 40.1; or again, 40.4, 40.5, or 40.6, according as it indicates a *fine* index; an exact coincidence with, or a little over 40, or 40.5, respectively. So also 40.3, and 40.7, or 40.8 respectively. In reading Kithleyford's *Hygrometer*, and *Hygrometer*, the reading ought to be taken to tenths of a degree—38.3, 40.5, or 40.1; or again, 40.4, 40.5, or 40.6, according as it indicates a *fine* index; an exact coincidence with, or a little over 40, or 40.5, respectively. So also 40.3, and 40.7, or 40.8 respectively. In reading Kithleyford's *Hygrometer*, and *Hygrometer*, the reading ought to be taken to tenths of a degree—38.3, 40.5, or 40.1; or again, 40.4, 40.5, or 40.6, according as it indicates a *fine* index; an exact coincidence with, or a little over 40, or 40.5, respectively. So also 40.3, and 40.7, or 40.8 respectively. In reading Kithleyford's *Hygrometer*, and *Hygrometer*, the reading ought to be taken to tenths of a degree—38.3, 40.5, or 40.1; or again, 40.4, 40.5, or 40.6, according as it indicates a *fine* index; an exact coincidence with, or a little over 40, or 40.5, respectively. So also 40.3, and 40.7, or 40.8 respectively. In reading Kithleyford's *Hygrometer*, and *Hygrometer*, the reading ought to be taken to tenths of a degree—38.3, 40.5, or 40.1; or again, 40.4, 40.5, or 40.6, according as it indicates a *fine* index; an exact coincidence with, or a little over 40, or 40.5, respectively. So also 40.3, and 40.7, or 40.8 respectively. In reading Kithleyford's *Hygrometer*, and *Hygrometer*, the reading ought to be taken to tenths of a degree—38.3, 40.5, or 40.1; or again, 40.4, 40.5, or 40.6, according as it indicates a *fine* index; an exact coincidence with, or a little over 40, or 40.5, respectively. So also 40.3, and 40.7, or 40.8 respectively. In reading Kithleyford's *Hygrometer*, and *Hygrometer*, the reading ought to be taken to tenths of a degree—38.3, 40.5, or 40.1; or again, 40.4, 40.5, or 40.6, according as it indicates a *fine* index; an exact coincidence with, or a little over 40, or 40.5, respectively. So also 40.3, and 40.7, or 40.8 respectively. In reading Kithleyford's *Hygrometer*, and *Hygrometer*, the reading ought to be taken to tenths of a degree—38.3, 40.5, or 40.1; or again, 40.4, 40.5, or 40.6, according as it indicates a *fine* index; an exact coincidence with, or a little over 40, or 40.5, respectively. So also 40.3, and 40.7, or 40.8 respectively. In reading Kithleyford's *Hygrometer*, and *Hygrometer*, the reading ought to be taken to tenths of a degree—38.3, 40.5, or 40.1; or again, 40.4, 40.5, or 40.6, according as it indicates a *fine* index; an exact coincidence with, or a little over 40, or 40.5, respectively. So also 40.3, and 40.7, or 40.8 respectively. In reading Kithleyford's *Hygrometer*, and *Hygrometer*, the reading ought to be taken to tenths of a degree—38.3, 40.5, or 40.1; or again, 40.4, 40.5, or 40.6, according as it indicates a *fine* index; an exact coincidence with, or a little over 40, or 40.5, respectively. So also 40.3, and 40.7, or 40.8 respectively. In reading Kithleyford's *Hygrometer*, and *Hygrometer*, the reading ought to be taken to tenths of a degree—38.3, 40.5, or 40.1; or again, 40.4, 40.5, or 40.6, according as it indicates a *fine* index; an exact coincidence with, or a little over 40, or 40.5, respectively. So also 40.3, and 40.7, or 40.8 respectively. In reading Kithleyford's *Hygrometer*, and *Hygrometer*, the reading ought to be taken to tenths of a degree—38.3, 40.5, or 40.1; or again, 40.4, 40.5, or 40.6, according as it indicates a *fine* index; an exact coincidence with, or a little over 40, or 40.5, respectively. So also 40.3, and 40.7, or 40.8 respectively. In reading Kithleyford's *Hygrometer*, and *Hygrometer*, the reading ought to be taken to tenths of a degree—38.3, 40.5, or 40.1; or again, 40.4, 40.5, or 40.6, according as it indicates a *fine* index; an exact coincidence with, or a little over 40, or 40.5, respectively. So also 40.3, and 40.7, or 40.8 respectively. In reading Kithleyford's *Hygrometer*, and *Hygrometer*, the reading ought to be taken to tenths of a degree—38.3, 40.5, or 40.1; or again, 40.4, 40.5, or 40.6, according as it indicates a *fine* index; an exact coincidence with, or a little over 40, or 40.5, respectively. So also 40.3, and 40.7, or 40.8 respectively. In reading Kithleyford's *Hygrometer*, and *Hygrometer*, the reading ought to be taken to tenths of a degree—38.3, 40.5, or 40.1; or again, 40.4, 40.5, or 40.6, according as it indicates a *fine* index; an exact coincidence with, or a little over 40, or 40.5, respectively. So also 40.3, and 40.7, or 40.8 respectively. In reading Kithleyford's *Hygrometer*, and *Hygrometer*, the reading ought to be taken to tenths of a degree—38.3, 40.5, or 40.1; or again, 40.4, 40.5, or 40.6, according as it indicates a *fine* index; an exact coincidence with, or a little over 40, or 40.5, respectively. So also 40.3, and 40.7, or 40.8 respectively. In reading Kithleyford's *Hygrometer*, and *Hygrometer*, the reading ought to be taken to tenths of a degree—38.3, 40.5, or 40.1; or again, 40.4, 40.5, or 40.6, according as it indicates a *fine* index; an exact coincidence with, or a little over 40, or 40.5, respectively. So also 40.3, and 40.7, or 40.8 respectively. In reading Kithleyford's *Hygrometer*, and *Hygrometer*, the reading ought to be taken to tenths of a degree—38.3, 40.5, or 40.1; or again, 40.4, 40.5, or 40.6, according as it indicates a *fine* index; an exact coincidence with, or a little over 40, or 40.5, respectively. So also 40.3, and 40.7, or 40.8 respectively. In reading Kithleyford's *Hygrometer*, and *Hygrometer*, the reading ought to be taken to tenths of a degree—38.3, 40.5, or 40.1; or again, 40.4, 40.5, or 40.6, according as it indicates a *fine* index; an exact coincidence with, or a little over 40, or 40.5, respectively. So also 40.3, and 40.7, or 40.8 respectively. In reading Kithleyford's *Hygrometer*, and *Hygrometer*, the reading ought to be taken to tenths of a degree—38.3, 40.5, or 40.1; or again, 40.4, 40.5, or 40.6, according as it indicates a *fine* index; an exact coincidence with, or a little over 40, or 40.5, respectively. So also 40.3, and 40.7, or 40.8 respectively. In reading Kithleyford's *Hygrometer*, and *Hygrometer*, the reading ought to be taken to tenths of a degree—38.3, 40.5, or 40.1; or again, 40.4, 40.5, or 40.6, according as it indicates a *fine* index; an exact coincidence with, or a little over 40, or 40.5, respectively. So also 40.3, and 40.7, or 40.8 respectively. In reading Kithleyford's *Hygrometer*, and *Hygrometer*, the reading ought to be taken to tenths of a degree—38.3, 40.5, or 40.1; or again, 40.4, 40.5, or 40.6, according as it indicates a *fine* index; an exact coincidence with, or a little over 40, or 40.5, respectively. So also 40.3, and 40.7, or 40.8 respectively. In reading Kithleyford's *Hygrometer*, and *Hygrometer*, the reading ought to be taken to tenths of a degree—38.3, 40.5, or 40.1; or again, 40.4, 40.5, or 40.6, according as it indicates a *fine* index; an exact coincidence with, or a little over 40, or 40.5, respectively. So also 40.3, and 40.7, or 40.8 respectively. In reading Kithleyford's *Hygrometer*, and *Hygrometer*, the reading ought to be taken to tenths of a degree—38.3, 40.5, or 40.1; or again, 40.4, 40.5, or 40.6, according as it indicates a *fine* index; an exact coincidence with, or a little over 40, or 40.5, respectively. So also 40.3, and 40.7, or 40.8 respectively. In reading Kithleyford's *Hygrometer*, and *Hygrometer*, the reading ought to be taken to tenths of a degree—38.3, 40.5, or 40.1; or again, 40.4, 40.5, or 40.6, according as it indicates a *fine* index; an exact coincidence with, or a little over 40, or 40.5, respectively. So also 40.3, and 40.7, or 40.8 respectively. In reading Kithleyford's *Hygrometer*, and *Hygrometer*, the reading ought to be taken to tenths of a degree—38.3, 40.5, or 40.1; or again, 40.4, 40.5, or 40.6, according as it indicates a *fine* index; an exact coincidence with, or a little over 40, or 40.5, respectively. So also 40.3, and 40.7, or 40.8 respectively. In reading Kithleyford's *Hygrometer*, and *Hygrometer*, the reading ought to be taken to tenths of a degree—38.3, 40.5, or 40.1; or again, 40.4, 40.5, or 40.6, according as it indicates a *fine* index; an exact coincidence with, or a little over 40, or 40.5, respectively. So also 40.3, and 40.7, or 40.8 respectively. In reading Kithleyford's *Hygrometer*, and *Hygrometer*, the reading ought to be taken to tenths of a degree—38.3, 40.5, or 40.1; or again, 40.4, 40.5, or 40.6, according as it indicates a *fine* index; an exact coincidence with, or a little over 40, or 40.5, respectively. So also 40.3, and 40.7, or 40.8 respectively. In reading Kithleyford's *Hygrometer*, and *Hygrometer*, the reading ought to be taken to tenths of a degree—38.3, 40.5, or 40.1; or again, 40.4, 40.5, or 40.6, according as it indicates a *fine* index; an exact coincidence with, or a little over 40, or 40.5, respectively. So also 40.3, and 40.7, or 40.8 respectively. In reading Kithleyford's *Hygrometer*, and *Hygrometer*, the reading ought to be taken to tenths of a degree—38.3, 40.5, or 40.1; or again, 40.4, 40.5, or 40.6, according as it indicates a *fine* index; an exact coincidence with, or a little over 40, or 40.5, respectively. So also 40.3, and 40.7, or 40.8 respectively. In reading Kithleyford's *Hygrometer*, and *Hygrometer*, the reading ought to be taken to tenths of a degree—38.3, 40.5, or 40.1; or again, 40.4, 40.5, or 40.6, according as it indicates a *fine* index; an exact coincidence with, or a little over 40, or 40.5, respectively. So also 40.3, and 40.7, or 40.8 respectively. In reading Kithleyford's *Hygrometer*, and *Hygrometer*, the reading ought to be taken to tenths of a degree—38.3, 40.5, or 40.1; or again, 40.4, 40.5, or 40.6, according as it indicates a *fine* index; an exact coincidence with, or a little over 40, or 40.5, respectively. So also 40.3, and 40.7, or 40.8 respectively. In reading Kithleyford's *Hygrometer*, and *Hygrometer*, the reading ought to be taken to tenths of a degree—38.3, 40.5, or 40.1; or again, 40.4, 40.5, or 40.6, according as it indicates a *fine* index; an exact coincidence with, or a little over 40, or 40.5, respectively. So also 40.3, and 40.7, or 40.8 respectively. In reading Kithleyford's *Hygrometer*, and *Hygrometer*, the reading ought to be taken to tenths of a degree—38.3, 40.5, or 40.1; or again, 40.4, 40.5, or 40.6, according as it indicates a *fine* index; an exact coincidence with, or a little over 40, or 40.5, respectively. So also 40.3, and 40.7, or 40.8 respectively. In reading Kithleyford's *Hygrometer*, and *Hygrometer*, the reading ought to be taken to tenths of a degree—38.3, 40.5, or 40.1; or again, 40.4, 40.5, or 40.6, according as it indicates a *fine* index; an exact coincidence with, or a little over 40, or 40.5, respectively. So also 40.3, and 40.7, or 40.8 respectively. In reading Kithleyford's *Hygrometer*, and *Hygrometer*, the reading ought to be taken to tenths of a degree—38.3, 40.5, or 40.1; or again, 40.4, 40.5, or 40.6, according as it indicates a *fine* index; an exact coincidence with, or a little over 40, or 40.5, respectively. So also 40.3, and 40.7, or 40.8 respectively. In reading Kithleyford's *Hygrometer*, and *Hygrometer*, the reading ought to be taken to tenths of a degree—38.3, 40.5, or 40.1; or again, 40.4, 40.5, or 40.6, according as it indicates a *fine* index; an exact coincidence with, or a little over 40, or 40.5, respectively. So also 40.3, and 40.7, or 40.8 respectively. In reading Kithleyford's *Hygrometer*, and *Hygrometer*, the reading ought to be taken to tenths of a degree—38.3, 40.5, or 40.1; or again, 40.4, 40.5, or 40.6, according as it indicates a *fine* index; an exact coincidence with, or a little over 40, or 40.5, respectively. So also 40.3, and 40.7, or 40.8 respectively. In reading Kithleyford's *Hygrometer*, and *Hygrometer*, the reading ought to be taken to tenths of a degree—38.3, 40.5, or 40.1; or again, 40.4, 40.5, or 40.6, according as it indicates a *fine* index; an exact coincidence with, or a little over 40, or 40.5, respectively. So also 40.3, and 40.7, or 40.8 respectively. In reading Kithleyford's *Hygrometer*, and *Hygrometer*, the reading ought to be taken to tenths of a degree—38.3, 40.5, or 40.1; or again, 40.4, 40.5, or 40.6, according as it indicates a *fine* index; an exact coincidence with, or a little over 40, or 40.5, respectively. So also 40.3, and 40.7, or 40.8 respectively. In reading Kithleyford's *Hygrometer*, and *Hygrometer*, the reading ought to be taken to tenths of a degree—38.3, 40.5, or 40.1; or again, 40.4, 40.5, or 40.6, according as it indicates a *fine* index; an exact coincidence with, or a little over 40, or 40.5, respectively. So also 40.3, and 40.7, or 40.8 respectively. In reading Kithleyford's *Hygrometer*, and *Hygrometer*, the reading ought to be taken to tenths of a degree—38.3, 40.5, or 40.1; or again, 40.4, 40.5, or 40.6, according as it indicates a *fine* index; an exact coincidence with, or a little over 40, or 40.5, respectively. So also 40.3, and 40.7, or 40.8 respectively. In reading Kithleyford's *Hygrometer*, and *Hygrometer*, the reading ought to be taken to tenths of a degree—38.3, 40.5, or 40.1; or again, 40.4, 40.5, or 40.6, according as it indicates a *fine* index; an exact coincidence with, or a little over 40, or 40.5, respectively. So also 40.3, and 40.7, or 40.8 respectively. In reading Kithleyford's *Hygrometer*, and *Hygrometer*, the reading ought to be taken to tenths of a degree—38.3, 40.5, or 40.1; or again, 40.4, 40.5, or 40.6, according as it indicates a *fine* index; an exact coincidence with, or a little over 40, or 40.5, respectively. So also 40.3, and 40.7, or 40.8 respectively. In reading Kithleyford's *Hygrometer*, and *Hygrometer*, the reading ought to be taken to tenths of a degree—38.3, 40.5, or 40.1; or again, 40.4, 40.5, or 40.6, according as it indicates a *fine* index; an exact coincidence with, or a little over 40, or 40.5, respectively. So also 40.3, and 40.7, or 40.8 respectively. In reading Kithleyford's *Hygrometer*, and *Hygrometer*, the reading ought to be taken to tenths of a degree—38.3, 40.5, or 40.1; or again, 40.4, 40.5, or 40.6, according as it indicates a *fine* index; an exact coincidence with, or a little over 40, or 40.5, respectively. So also 40.3, and 40.7, or 40.8 respectively. In reading Kithleyford's *Hygrometer*, and *Hygrometer*, the reading ought to be taken to tenths of a degree—38.3, 40.5, or 40.1; or again, 40.4, 40.5, or 40.6, according as it indicates a *fine* index; an exact coincidence with, or a little over 40, or 40.5, respectively. So also 40.3, and 40.7, or 40.8 respectively. In reading Kithleyford's *Hygrometer*, and *Hygrometer*, the reading ought to be taken to tenths of a degree—38.3, 40.5, or 40.1; or again, 40.4, 40.5, or 40.6, according as it indicates a *fine* index; an exact coincidence with, or a little over 40, or 40.5, respectively. So also 40.3, and 40.7, or 40.8 respectively. In reading Kithleyford's *Hygrometer*, and *Hygrometer*, the reading ought to be taken to tenths of a degree—38.3, 40.5, or 40.1; or again, 40.4, 40.5, or 40.6, according as it indicates a *fine* index; an exact coincidence with, or a little over 40, or 40.5, respectively. So also 40.3, and 40.7, or 40.8 respectively. In reading Kithleyford's *Hygrometer*, and *Hygrometer*, the reading ought to be taken to tenths of a degree—38.3, 40.5, or 40.1; or again, 40.4, 40.5, or 40.6, according as it indicates a *fine* index; an exact coincidence with, or a little over 40, or 40.5, respectively. So also 40.3, and 40.7, or 40.8 respectively. In reading Kithleyford's *Hygrometer*, and *Hygrometer*, the reading ought to be taken to tenths of a degree—38.3, 40.5, or 40.1; or again, 40.4, 40.5, or 40.6, according as it indicates a *fine* index; an exact coincidence with, or a little over 40, or 40.5, respectively. So also 40.3, and 40.7, or 40.8 respectively. In reading Kithleyford's *Hygrometer*, and *Hygrometer*, the reading ought to be taken to tenths of a degree—38.3, 40.5, or 40.1; or again, 40.4, 40.5, or 40.6, according as it indicates a *fine* index; an exact coincidence with, or a little over 40, or 40.5, respectively. So also 40.3, and 40.7, or 40.8 respectively. In reading Kithleyford's *Hygrometer*, and *Hygrometer*, the reading ought to be taken to tenths of a degree—38.3, 40.5, or 40.1; or again, 40.4, 40.5, or 40.6, according as it indicates a *fine* index; an exact coincidence with, or a little over 40, or 40.5, respectively. So also 40.3, and 40.7, or 40.8 respectively. In reading Kithleyford's *Hygrometer*, and *Hygrometer*, the reading ought to be taken to tenths of a degree—38.3, 40.5, or 40.1; or again, 40.4, 40.5, or 40.6, according as it indicates a *fine* index; an exact coincidence with, or a little over 40, or 40.5, respectively. So also 40.3, and 40.7, or 40.8 respectively. In reading Kithleyford's *Hygrometer*, and *Hygrometer*, the reading ought to be taken to tenths of a degree—38.3, 40.5, or 40.1; or again, 40.4, 40.5, or 40.6, according as it indicates a *fine* index; an exact coincidence with, or a little over 40, or 40.5, respectively. So also 40.3, and 40.7, or 40.8 respectively. In reading Kithleyford's *Hygrometer*, and *Hygrometer*, the reading ought to be taken to tenths of a degree—38.3, 40.5, or 40.1; or again, 40.4, 40.5, or 40.6, according as it indicates a *fine* index; an exact coincidence with, or a little over 40, or 40.5, respectively. So also 40.3, and 40.7, or 40.8 respectively. In reading Kithleyford's *Hygrometer*, and *Hygrometer*, the reading ought to be taken to tenths of a degree—38.3, 40.5, or 40.1; or again, 40.4, 40.5, or 40.6, according as it indicates a *fine* index; an exact coincidence with, or a little over 40, or 40.5, respectively. So also 40.3, and 40.7, or 40.8 respectively. In reading Kithleyford's *Hygrometer*, and *Hygrometer*, the reading ought to be taken to tenths of a degree—38.3, 40.5, or 40.1; or again, 40.4, 40.5, or 40.6, according as it indicates a *fine* index; an exact coincidence with, or a little over 40, or 40.5, respectively. So also 40.3, and 40.7, or 40.8 respectively. In reading Kithleyford's *Hygrometer*, and *Hygrometer*, the reading ought to be taken to tenths of a degree—38.3, 40.5, or 40.1; or again, 40.4, 40.5, or 40.6, according as it indicates a *fine* index; an exact coincidence with, or a little over 40, or 40.5, respectively. So also 40.3, and 40.7, or 40.8 respectively. In reading Kithleyford's *Hygrometer*, and *Hygrometer*, the reading ought to be taken to tenths of a degree—38.3, 40.5, or 4

SCOTTISH METEOROLOGICAL SOCIETY.

Observations taken at Braemar, County of Abertay, in Lat. 57° N., Long. 3° 24' W., Distance from Sea 60 miles.
Height of Cistern of the Barometer above Mean Sea-level 1114 feet, above Ground 3 feet. During the MONTH of March 1871.
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.		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. No.	Min. on Grass.	Dry bulb.	Wet bulb.	Dry bulb.	Wet bulb.	Direction.	Force.	Direction.	Force.	9 h. A.M.	No. of hours in which it fell.	Amount in Inches.	Velocity (0-10), and Direction.	Amount (0-10), and Direction.	Velocity (0-10), and Direction.	No. 1. 3 inches.	No. 2. 12 inches.	No. 3. 22 inches.					
		inches.	°	inches.	°																										
	1	28.500		28.634		49.8	34.5	62.7	31.0	37.7	37.0	39.0	38.6	SW	0.5	SW	0.											Dull	1		
	2	28.750		28.704		46.1	39.3	60.8	32.0	40.1	39.7	46.0	41.9	S	0.5	SW	2.											do	2		
	3	28.750		28.636		58.0	41.0	70.3	35.0	46.8	46.0	37.0	36.4	SW	1.5	SW	2.												do	3	
	4	28.500		28.764		53.7	44.8	80.0	36.3	44.0	46.3	48.3	48.0	SW	1.5	SW	1.5.												do	4	
	5	28.550		28.600		55.0	42.3	60.0	32.0	47.8	46.7	59.2	53.0	S	0.5	SW	0.5.												Low & Sunshine	5	
	6	28.650		28.574		55.0	35.6	70.0	24.0	45.3	45.0	55.6	55.0	SW	0.	SW	1.5.												do	6	
	7	28.500		28.752		54.6	37.9	76.8	29.0	33.2	35.0	39.7	34.1	S	0.	S	0.5.												do	7	
	8	28.100		28.204		57.3	34.8	70.4	30.3	40.1	39.3	58.2	58.0	SW	0.	SW	0.												do	8	
	9	28.564		28.600		47.0	38.2	64.3	27.8	38.0	38.4	34.7	34.0	SW	0.5	SW	0.												Dull all day	9	
	10	28.744		28.744		47.0	34.3	60.0	28.3	36.7	36.0	56.0	55.8	SW	0.5	SW	1.												do	10	
	11	28.750		28.676		48.7	40.1	52.6	24.7	38.3	37.4	37.0	36.4	SW	0.	S	0.5.												Very cold all day	11	
	12	28.550		28.626		49.6	34.0	63.8	28.8	44.0	43.6	39.3	34.0	SW	1.5	S	0.5.												Dull	12	
	13	28.500		28.666		45.3	35.7	70.4	33.3	40.0	39.7	41.7	41.2	SW	0.5	SW	0.5.												Low All Rain P.M.	13	
	14	28.700		28.578		46.7	38.7	61.2	30.0	41.0	40.8	42.3	41.8	SW	0.	S	0.												Dull	14	
	15	28.600		28.584		48.2	34.9	65.2	25.0	41.0	40.7	44.3	44.1	S	0.5	SW	0.												Dull	15	
	16	28.500		28.650		52.1	43.3	80.3	32.7	46.0	45.8	44.4	44.3	SW	0.5	SW	0.5.												Low & fine	16	
	17	28.552		28.500		52.6	47.8	81.3	35.8	43.2	44.1	44.0	43.7	S	1.	SW	2.												Mostly in hills	17	
	18	28.250		28.800		50.9	41.3	80.6	30.3	42.3	41.7	44.3	43.7	SW	1.5	SW	2.5.												Dull & fair	18	
	19	28.820		28.800		43.6	32.8	74.0	26.7	34.1	35.3	32.0	31.4	SW	1.5	SW	3.												Rain All Snow P.M.	19	
	20	28.702		28.650		40.0	27.0	60.3	19.0	29.3	29.0	26.8	26.0	SW	1	N	1.5.												Showery.	20	
	21	28.700		28.830		42.1	33.7	60.0	14.3	25.2	25.0	27.0	26.8	SW	0.5	SW	0.5.												Snow	21	
	22	28.800		28.900		33.7	22.3	63.1	12.6	32.7	32.6	32.0	31.8	SW	0.5	SW	0.5.												Snow	22	
	23	28.884		28.850		34.0	29.0	54.9	28.8	30.3	30.0	30.0	30.0	SW	1.	SW	0.5.												Snow	23	
	24	28.728		28.650		35.2	28.8	50.0	26.8	31.0	31.0	29.8	29.8	SW	1	SW	0.												do	24	
	25	28.530		28.550		35.2	22.3	50.0	22.3	31.0	31.0	21.3	21.0	SW	0.	SW	0.5.												do	25	
	26	28.700		28.152		33.8	19.8	67.0	14.8	32.8	32.8	37.0	37.0	SW	0.5	SW	1.												Low & Sunshine	26	
	27	28.202		28.062		42.3	28.0	64.0	23.3	34.3	33.8	30.3	30.0	SW	1.	SW	1.												Snow	27	
	28	28.078		27.984		44.0	19.0	67.3	15.3	29.0	29.0	35.3	34.8	SW	0.	SW	0.5.												Low & Sunshine	28	
	29	28.050		28.072		40.3	27.0	49.8	23.4	34.0	33.5	34.0	33.8	SW	0.	SW	0.5.												Shawy Snow & Frost	29	
	30	28.032		28.250		38.0	32.0	55.3	32.0	34.0	34.8	35.2	34.2	SW	1.	SW	1.												do	30	
	31	28.562		28.400		37.3	31.4	57.2	20.2	33.3	32.2	32.8	31.0	SW	1.	SW	0.5.												do	31	
	Sums.	15498		15584		1665	1391	126	2443	229	6214	2190	1846		195	265													279	279	
	Means.	28500		28503		406	345	704	279	374	369	364	360		63	85													90	90	
	† Total Corrections for Instrumental Errors.	-009		-009																											
	‡ Corrections for Diurnal Range.																														
	“Corrected Means.”	28491		28494																											
	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), = 28.468

“Corrected Mean” of Barometer at 9 P.M., minus the Correction†† for Temp. (Col. 4), = 28.474

Mean at Station, corrected, and at 32°, = 28.471

Correction for height, feet above Mean Sea-level, = 1.202

Mean, reduced to 32°, and Sea-level, = 29.673

Highest Reading, corrected for Index error, on the 22nd, = 28.864

Lowest Do. Do. on the 28th, = 27.982

Difference, or Monthly Range, = 0.918

S.-R. THERMOMETER, (in shade, etc.), Highest in Month, (corrected for Index Errors), on the 8th, = 57.3

Lowest in Month, corrected for Index errors, on the 28th, = 19.0

Difference, or Monthly Range, = 38.3

“Corrected Mean” of all the Highest, (Col. 5), = 48.4

“Corrected Mean” of all the Lowest, (Col. 6), = 34.5

Difference, or Mean Daily Range, = 10.9

“Calculated Mean Temperature of Month, = 40.0

S.-R. THERMOMETER, Black Bulb in Sun, Highest, (corrected for Index Errors), on the 27th, = 104.0

“Corrected Mean,” (Col. 7), of Black Bulb. Max. in Sun, = 70.4

Lowest at Night, Black Bulb, (corrected for Index errors), on the 28th, = 15.3

“Corrected Mean,” (Col. 8), of Black Bulb. Min. on grass, = 27.9

Difference of above Means or Range (“exposed”), = 42.5

HYGROMETER, Mean (corrected) A.M. and P.M. Reading of Dry Bulb, (Cols. 9 and 11), = 36.9

Mean (corrected) A.M. and P.M. Reading of Wet Bulb, (Cols. 10 and 12), = 36.4

†† Computed Temperature of Dew-Point, = 35.7

†† Do. Elastic Force of Vapour, = 209

†† Do. Weight of Vapour in a Cubic Foot of Air, = 96

†† Relative Humidity, (Saturation = 100), = 96

RAIN fell on 17 Days; Amount in Inches, = 2.64

WIND.		SUMMARY.									
Direction.	No.	N	NE	E	SE	S	SW	W	NW	Mean Force.	Mean Velocity in miles per day.
A.M.	0	9	0	3	5	13	1	0	0	063	
P.M.	1	9	0	1	4	13	1	2	0	085	
Mean.	1	9	0	2	4	13	1	1	0	074	0.55

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

Observations made and
Return verified by

(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 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 exactly 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 invariable-pieced Barometers have been approved of by the Council; it properly tested and attended to, they are both well adapted to Meteorological purposes. An excellent Barometer is constructed by Mr. A. de London, the use of which is attended with the great convenience of requiring no adjustment of the cistern. Its scale-bubbles are not three 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 leaden, and they, by aid of a screw acting on the bottom, the surface of the contained mercury can be adjusted to the zero-point of the fixed scale; their coincidence being indicated by a little ivory float, whose stem passes freely through the lid and case of the cistern. When the index-time on this little piston-rod is brought, by the adjusting screw, to form one straight line with those on its ivory frame, the surface of the mercury is then at the exact height from which the scale is graduated. In taking an observation, this preliminary setting must be made with scrupulous accuracy; as a slight error here will vitiate the readings from the *vernier*.

When a Barometer having adjustable surfaces has to be removed from its fastenings, the ivory peg must be screwed so as to form a tight plug to the cistern. Then *serve up* the mercury to within a quarter of an inch of the top of the tube, and take down the instrument; it may then be carried with the cistern uppermost. Before suspending the Barometer for use, it must be ascertained whether the space above the mercury in the tube is a complete vacuum; this is the case when, on inclining the instrument so that the mercury strikes the top of the tube, a *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 *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 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 opticians.

Self-registering Thermometers.—Professor Phillips, 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 when graduated on the glass stem and affixed to a frame separate from the "Maximum." This Thermometer is liable to two derangements, both of which must be guarded against, and may be easily remedied by an observer. When the 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 near the top of the tube, and must be discoloured from thence by heating that part over a lamp; the alcohol will evaporate and again condense in contact with the body of the liquid. These instruments should be hung horizontally.

The above remarks apply equally to the Thermometers for registering the greatest heat from the sun's rays, and the least

from radiation during night. Their bulbs have a black coating, which may easily be made, or mended, by the application of a mixture of lamp black and printer's ink. They are placed in shallow blackened boxes, whose sides protect the bulbs from the wind. The "Maximum" should rest on wooden supports a few inches from the surface of the grass, in an open situation. Snow must not be allowed to cover either of these Thermometers; 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, undergo repairs, they are very liable to be moved from their position on the Scale, and ought never afterwards to be used, without being re-tested. The self-registering, and especially the "Minimum" Thermometers, ought frequently to be compared with the dry bulb of the Hygrometer. The freezing-point of each Thermometer (marked by a scratch on the tube) ought to be tested once a year, in snow or melting ice. For comparison of Thermometers, a properly tested Thermometer may be had, on loan, by any observer, from the Meteorological Secretary.

The Hygrometer consists of two Thermometers usually, but not necessarily, mounted on one frame. As apparently slight deviations from the approved and well-tested form of this apparatus 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 manila must be of medium fineness, and inserted 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 manila 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 soil 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 is to be immediately altered by putting the boxwood frame out of the tin case, and hanging them side by side, so that the forementioned requirements shall be complied with, as far as possible.

Reading of the Thermometer.—Great care must be taken to avoid the effects of refraction, by bringing the eye exactly opposite the tip of the index or column of mercury. The reading ought to be taken to tenths of a degree, and noted in decimals. Thus the Thermometer will be read—39.9, 40.0, or 40.1; or again, 40.3, 40.5, or 40.6, according as it indicates a little under, an exact coincidence with, or a little over 40°; or 40.5, respectively. So also 41.4, 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 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 schedules, the indications registered on the 3d, are those of a series of phenomena commencing at 9 P.M. on the 2d, and extending till 9 P.M. on the 3d.

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 earnestly 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.

Clouds.—Convenient abbreviations for Luke Howard's nomenclature of clouds will be found on the other side. The amount of cloud in the atmosphere ought to be estimated from the greater or less obscuration of the sky overhead (i.e., within 20° or 30° of the zenith). The strata of clouds that appear near the horizon are viewed obliquely; and thus, being unable to judge of their amount, we ought not to take them into account in the clouds column, though their appearances and changes ought to be noted among the "Remarks." The amount of cloud is entered from scale of 0 to 10; thus, when the sky overhead is half covered by clouds, 5 is entered as the *observation*, and so on. Observations of the clouds are made at 9 A.M. and at sunset, as illustrating the condition and currents of the upper and lower regions of the atmosphere. The entries in the schedule are to be made in the following manner:—In the column "Velocity and Direction," 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 4, st., (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 the spurs and rocks round the coast, where it is not influenced by that of river water. At or near the time of high water, on the 5th, 15th, and 25th of each month, the thermometer ought to be sunk exactly six feet (one fathom), and after ten minutes have elapsed, drawn up and read. When convenient, extra sea observations might be taken for other and greater depths, noting always the temperature of the air, and the hour of observation; and continuing to observe for particular depths.

Temperature of Wells.—The temperature of the water at the bottoms of wells ought, when practicable, to be taken, and the depth of the well and of the water noted.

Ozone.—Mention whether Selwyn's or Mohr's papers are used. The paper is affixed by a pin to a board in the thermometer box, and the indication registered at 9 A.M. and 9 P.M. It is desired that these indications be registered in connection with the force and direction of the wind at the time of observation, in the following manner:—thus 3°, as an ozone entry in the schedule, will indicate that the ozone paper is tinted as "3" on the scale, that the wind is from the N.W., and that its force on the scale 0–6 is "4"; i.e., that it is blowing fresh.

Electricity.—Too much importance cannot be attached to electric condition of the atmosphere in connection with terrestrial magnetism, and as a meteorological phenomenon. A proper Electrometer is necessary to every complete meteorological observatory.

Remarks.—The "Remarks" column is too narrow, but unfortunately 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 mists, 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 attacking their maximum, as well as such notes on storms as have been hinted at above. When lofty hills are in the vicinity of an Observatory, the height of clouds and of the snow-line in winter ought to be recorded.

By the use of abbreviations, the state of the weather at 9 A.M. and 9 P.M. ought to be registered, either in two columns, otherwise unoccupied, or in two ruled off for the purpose, from that headed "Remarks." It is intended that observations by the Electrometer should be entered in this manner or on the side-margin. Additional remarks may be made on the side-margin.

Observations in connection with the periodic return of the seasons, possess not only great scientific value, but are of considerable interest to the Agriculturist. The Council would direct the special attention of Observers to the registration of such phenomena; that the published Summaries may fairly represent the whole of Scotland. Observation ought to be confined to individual trees and shrubs; to particular species of birds; and, in the case of crops, to specified sorts reared from year to year on a selected piece of ground or farm.

The Council recommend that *fern 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.

BOOK-POST.

EDINBURGH.

General Post Office Buildings,
Secretary of the Meteorological Society of Scotland,

MR ALEXANDER BUCHAN,

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 Out or Raised.
Alder,					Barley,				
Ash,					Bere or Bigg,				
Beech,					Oats,				
Birch,					Wheat,				
Elm,					Peas,				
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,		
Mezerion,		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.

EDINBURGH
AP 10
72

SCOTTISH METEOROLOGICAL SOCIETY.

Observations taken at Brechin, County of Abertay, in Lat. 57° 14', Long. 2° 24', Distance from Sea 60 miles.
Height of Cistern of the Barometer above Mean Sea-level 114 feet, above Ground 0 feet.
During the MONTH of April, 1872.
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.		9 A.M.		P.M.		9 h. A.M.										
		Barometer, No.	Attached Ther- mometer	Barometer, No.	Attached Ther- mometer	Max. No.	Min. No.	Max. in sun's rays, No.	Min. on Grass, No.	Dry bulb.	Wet bulb.	Dry bulb.	Wet bulb.	Direction.	Force.	Direction.	Force.	Velocity (0-4), and Direction.	Amount in inches, No.	Velocity (0-4), and Direction.	Amount (0-10), and Species.	No.	12 inches.	22 inches.								
		inches.	°	inches.	°	No.	No.	No.	No.																							
	1	28.664		28.670		54.0	29.7	56.3	27.0	34.0	33.1	34.0	33.7	SE	0.5	18	0.5		9		8					99	Bull	1				
	2	28.418		28.430		46.1	31.0	89.8	28.0	34.8	33.3	35.4	33.8	SE	1.5	1		0.06	6		6					85	Sun	2				
	3	28.482		28.560		58.2	32.0	76.3	28.8	34.8	33.8	35.0	32.7	SE	2	2		—	10		10					86	Snow & Hail	3				
	4	28.800		29.000		42.3	32.1	80.3	27.7	35.0	34.6	33.9	33.2	SE	2	1	0.5	0.45	10		10					85	Stormy	4				
	5	29.150		29.160		41.0	27.8	100.0	25.7	37.1	36.4	34.1	33.8	SW	1	1	0.5	0.15	10		10					85	Sun	5				
	6	29.160		29.178		53.4	27.2	97.0	24.0	45.4	41.3	46.0	44.0	S	0.5	1.5		—	10		10					85	Sun	6				
	7	28.980		28.800		52.3	42.0	41.0	59.3	47.8	43.8	43.5	41.2	SE	2	1	1.5	—	10		10					85	Sun	7				
	8	28.624		28.800		47.5	38.6	47.5	54.8	46.7	41.7	40.0	36.7	SE	1.5	1	1.5	—	10		10					85	Sun	8				
	9	29.014		28.900		53.0	28.0	83.0	35.0	42.2	38.8	44.3	42.0	W	1	1	1.5	—	10		10					85	Sun	9				
	10	28.784		28.730		53.0	28.0	103.0	28.0	48.5	45.2	47.2	44.5	SW	1.5	1	0.5	—	10		10					85	Sun	10				
	11	28.692		28.680		59.8	35.8	103.0	26.8	48.8	43.0	47.4	43.0	SW	0.5	1	0.5	—	10		10					85	Sun	11				
	12	28.504		28.552		56.7	34.4	105.6	27.0	48.8	45.0	40.2	38.0	W	1	1	1.5	0.04	10		10					85	Thunder	12				
	13	28.842		28.876		45.8	37.8	75.0	32.0	44.3	41.0	43.3	41.6	W	1	1	1.5	—	10		10					85	Sun	13				
	14	28.880		28.534		55.8	42.3	95.1	39.2	49.5	45.7	47.8	45.5	W	1.5	1	1.5	—	10		10					85	Sun	14				
	15	28.700		28.708		52.4	40.7	105.0	36.2	47.2	44.2	42.0	37.0	SW	1.5	1	1.5	—	10		10					85	Light Storm A.P.	15				
	16	28.668		28.608		47.4	35.0	74.8	33.5	42.0	37.3	36.0	33.4	W	1.5	1	1.5	0.01	10		10					85	Light rain all day	16				
	17	28.576		28.710		42.8	32.5	87.0	33.0	42.0	37.0	36.5	35.4	SW	3	1	3	0.74	10		10					85	Sun	17				
	18	28.852		28.864		40.7	32.0	85.0	29.9	35.7	33.8	32.0	32.0	SE	3	1	0	0.24	10		10					85	Rain & Hail	18				
	19	28.808		28.628		39.3	31.8	82.7	28.7	34.8	34.0	34.7	32.8	SW	1	1	0.5	0.04	10		10					85	Stormy & Hail	19				
	20	28.550		28.600		39.5	31.2	67.7	28.0	33.2	33.0	31.2	30.3	SE	0	1	1	—	10		10					85	Stormy	20				
	21	28.522		28.450		34.2	24.8	82.7	26.8	34.7	34.0	33.0	33.0	SE	1	1	1.5	0.21	10		10					85	Sun	21				
	22	28.518		28.558		37.8	33.9	49.2	32.0	36.2	35.5	35.8	35.2	SE	1	1	1.5	0.55	10		10					85	Sun	22				
	23	28.220		28.292		45.3	33.8	70.3	34.0	38.8	38.8	39.4	39.4	SE	1.5	1	1.5	0.20	10		10					85	Sun	23				
	24	28.220		28.352		48.2	38.3	83.0	38.0	41.8	41.0	42.0	40.8	SE	0.5	1	1.5	0.04	10		10					85	S. Am. Sun. Vln.	24				
	25	28.664		28.650		48.0	37.7	96.5	32.5	45.8	41.2	44.1	42.0	S	0	1	1.5	0.35	10		10					85	Heavy Thunder	25				
	26	28.376		28.532		51.3	41.3	80.2	38.2	43.8	41.5	44.7	42.8	SE	0.5	1	1.5	0.07	10		10					85	Sun	26				
	27	28.658		28.680		51.5	41.7	99.0	37.1	48.2	45.0	46.0	44.5	S	1	1	1	0.24	10		10					85	Sun	27				
	28	28.652		28.724		53.8	41.0	100.0	38.8	45.2	43.9	43.0	40.4	SW	0	1	1	—	10		10					85	Sun	28				
	29	28.972		29.072		56.0	38.8	46.8	33.8	38.8	34.6	47.0	44.8	S	1	1	1.5	—	10		10					85	Sun	29				
	30	29.722		29.822		55.9	45.1	91.2	44.0	48.5	47.0	53.0	50.3	S	1	1	2	—	10		10					85	Sun	30				
	31																											85		31		
Sums.		20.297		20.808		239.6	173.8	211.8	94.1	50.1	279.9	176.6	261.9	35.0	39.0		3.29		232		223						270.270					
Means.		28.677		28.694		48.0	35.8	87.1	33.1	47.7	39.3	40.6	38.7	1.17	1.30				7.7		7.4						90.90					
Total Corrections for Instrumental Errors.		-0.09		-0.09																												
Corrected Means.		28.668		28.685																												
No. of Columns.		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	31

BAROMETER, "corrected Mean" at 9 A.M., minus the Correction $\frac{1}{1000}$ for Temp. (Col. 2), = 28.668
"Corrected Mean" of Barometer at 9 P.M., minus the Correction $\frac{1}{1000}$ for Temp. (Col. 4), = 28.654
Mean at Station, corrected, and at 32° = 28.644
Correction for height, feet above Mean Sea-level, = 1.202
Mean, reduced to 32°, and Sea-level, = 29.846
Highest Reading, corrected for Index error, on the 6 th, = 29.160
Lowest Do. Do. on the 23 th, = 28.230
Difference, or Monthly Range, = 0.930

S.-R. THERMOMETER, (in shade, etc.), Highest in Month, (corrected for Index Errors), on the 10 th, = 63.0
Lowest in Month, corrected for Index errors, on the 5 th, = 27.8
Difference, or Monthly Range, = 35.2
"Corrected Mean" of all the Highest, (Col. 5), = 48.0
"Corrected Mean" of all the Lowest, (Col. 6), = 33.8
Difference, or Mean Daily Range, = 12.2
Calculated Mean Temperature of Month, = 41.9

S.-R. THERMOMETER, Black Bulb in Sun, Highest, (corrected for Index Errors), on the 12 th, = 105.6
"Corrected Mean," (Col. 7), of Black Bulb, Max. in Sun, = 87.8
Lowest at Night, Black Bulb, (corrected for Index errors), on the 5 th, = 25.7
"Corrected Mean," (Col. 8), of Black Bulb, Min. on grass, = 33.1
Difference of above Means or Range ("exposed"), = 54.7

HYGROMETER, Mean (corrected) A.M. and P.M. Reading of Dry Bulb, (Cols. 9 and 11), = 41.9
Mean (corrected) A.M. and P.M. Reading of Wet Bulb, (Cols. 10 and 12), = 38.9
Computed Temperature of Dew-Point, = 36.0
Do. Elastic Force of Vapour, = 2.12
Do. Weight of Vapour in a Cubic Foot of Air, = 82
Relative Humidity, (Saturation = 100), = 82
RAIN fell on 15 Days; Amount in Inches, = 3.29

WIND.		SUMMARY.									
Direction.	N	NE	E	SE	S	SW	W	NW	Calm or Variable.	Mean Force.	Mean Velocity in miles per day.
A.M.	6	4	0	1	3	8	4	2	0	1.17	
P.M.	4	4	0	1	4	10	0	4	0	1.30	
Mean.	5	4	0	1	4	9	2	5	0	1.24	1.54

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

Observations made and
Return verified by

(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 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 fall 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.—*Wettest glasses and Jernolts*, 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-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. Adie of London, the use of which is attended with the great convenience of requiring no *adjustment* of the cistern. Its *scale-sticks* are not true guides, 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 they, 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; when 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 scale is graduated. In taking an observation, this *preliminary setting* must be made with scrupulous accuracy; a slight error here will vitiate the readings from the *verine*.

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

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

In taking an *Observation*, the attached Thermometer is first noted; the tube must then be gently tripped 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 *verine*, 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 ground in an exposed position, free from nearby 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 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 opticians, Messrs. Nippon and Zambra's Patent "Maximum" Thermometers, and recommended; printed directions for their use may be obtained with each instrument. The "Minimum" Thermometer of Rutherford is recommended when graduated on the glass stem and affixed to a frame separate from the "Maximum." This Thermometer is liable to two derangements, both of which must be guarded against, and may be easily remedied by an observer. When the *column of spirit breaks*, it may be re-united by rubbing 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 there by heating that part over a lamp; the alcohol will evaporate and again condense in contact with the body of the liquid. These instruments should be hung horizontally.

The above remarks apply equally to the Thermometers for registering the greatest heat from the sun's rays, and the least

from radiation during night. Their bulbs have a black coating, which may easily be made, or mended, by the application of a mixture of lamp black and printer's ink. They are placed in shallow blackened boxes, whose sides protect the bulbs from the wind. The "Maximum" should 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, nor the sun's heat to affect the Minimum Thermometer by distillation.

Position 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 now graduated on the stem, but merely on an attached scale, undergo repairs, they are very liable to be moved from their position on the scale, and ought never afterwards to be used, without being *re-tested*. The self-registering, and especially the "Minimum" Thermometers, ought frequently to be compared with the dry bulb of the Hygrometer. The freezing-point of each Thermometer (marked by a scratch on the tube) ought to be tested once a year, in snow or melting ice, for comparison of Thermometers, a properly tested Thermometer may be laid on them, 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 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 20 minutes before the hour of observation. From the film of ice thus formed, evaporation will proceed as from the moist cloth in ordinary circumstances. 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 forward frame out of the tin case, and raising the side by side, so that the frame mentioned respects 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 top 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—89.3, 40.0, or 40.1; or, if under, 40.2, 40.3, or 40.4; or, if over, 40, or 40.5, or 40.6, or 40.7, or 40.8, or 40.9, or 41, or 41.1, or 41.2, or 41.3, or 41.4, or 41.5, or 41.6, or 41.7, or 41.8, or 41.9, or 42, or 42.1, or 42.2, or 42.3, or 42.4, or 42.5, or 42.6, or 42.7, or 42.8, or 42.9, or 43, or 43.1, or 43.2, or 43.3, or 43.4, or 43.5, or 43.6, or 43.7, or 43.8, or 43.9, or 44, or 44.1, or 44.2, or 44.3, or 44.4, or 44.5, or 44.6, or 44.7, or 44.8, or 44.9, or 45, or 45.1, or 45.2, or 45.3, or 45.4, or 45.5, or 45.6, or 45.7, or 45.8, or 45.9, or 46, or 46.1, or 46.2, or 46.3, or 46.4, or 46.5, or 46.6, or 46.7, or 46.8, or 46.9, or 47, or 47.1, or 47.2, or 47.3, or 47.4, or 47.5, or 47.6, or 47.7, or 47.8, or 47.9, or 48, or 48.1, or 48.2, or 48.3, or 48.4, or 48.5, or 48.6, or 48.7, or 48.8, or 48.9, or 49, or 49.1, or 49.2, or 49.3, or 49.4, or 49.5, or 49.6, or 49.7, or 49.8, or 49.9, or 50, or 50.1, or 50.2, or 50.3, or 50.4, or 50.5, or 50.6, or 50.7, or 50.8, or 50.9, or 51, or 51.1, or 51.2, or 51.3, or 51.4, or 51.5, or 51.6, or 51.7, or 51.8, or 51.9, or 52, or 52.1, or 52.2, or 52.3, or 52.4, or 52.5, or 52.6, or 52.7, or 52.8, or 52.9, or 53, or 53.1, or 53.2, or 53.3, or 53.4, or 53.5, or 53.6, or 53.7, or 53.8, or 53.9, or 54, or 54.1, or 54.2, or 54.3, or 54.4, or 54.5, or 54.6, or 54.7, or 54.8, or 54.9, or 55, or 55.1, or 55.2, or 55.3, or 55.4, or 55.5, or 55.6, or 55.7, or 55.8, or 55.9, or 56, or 56.1, or 56.2, or 56.3, or 56.4, or 56.5, or 56.6, or 56.7, or 56.8, or 56.9, or 57, or 57.1, or 57.2, or 57.3, or 57.4, or 57.5, or 57.6, or 57.7, or 57.8, or 57.9, or 58, or 58.1, or 58.2, or 58.3, or 58.4, or 58.5, or 58.6, or 58.7, or 58.8, or 58.9, or 59, or 59.1, or 59.2, or 59.3, or 59.4, or 59.5, or 59.6, or 59.7, or 59.8, or 59.9, or 60, or 60.1, or 60.2, or 60.3, or 60.4, or 60.5, or 60.6, or 60.7, or 60.8, or 60.9, or 61, or 61.1, or 61.2, or 61.3, or 61.4, or 61.5, or 61.6, or 61.7, or 61.8, or 61.9, or 62, or 62.1, or 62.2, or 62.3, or 62.4, or 62.5, or 62.6, or 62.7, or 62.8, or 62.9, or 63, or 63.1, or 63.2, or 63.3, or 63.4, or 63.5, or 63.6, or 63.7, or 63.8, or 63.9, or 64, or 64.1, or 64.2, or 64.3, or 64.4, or 64.5, or 64.6, or 64.7, or 64.8, or 64.9, or 65, or 65.1, or 65.2, or 65.3, or 65.4, or 65.5, or 65.6, or 65.7, or 65.8, or 65.9, or 66, or 66.1, or 66.2, or 66.3, or 66.4, or 66.5, or 66.6, or 66.7, or 66.8, or 66.9, or 67, or 67.1, or 67.2, or 67.3, or 67.4, or 67.5, or 67.6, or 67.7, or 67.8, or 67.9, or 68, or 68.1, or 68.2, or 68.3, or 68.4, or 68.5, or 68.6, or 68.7, or 68.8, or 68.9, or 69, or 69.1, or 69.2, or 69.3, or 69.4, or 69.5, or 69.6, or 69.7, or 69.8, or 69.9, or 70, or 70.1, or 70.2, or 70.3, or 70.4, or 70.5, or 70.6, or 70.7, or 70.8, or 70.9, or 71, or 71.1, or 71.2, or 71.3, or 71.4, or 71.5, or 71.6, or 71.7, or 71.8, or 71.9, or 72, or 72.1, or 72.2, or 72.3, or 72.4, or 72.5, or 72.6, or 72.7, or 72.8, or 72.9, or 73, or 73.1, or 73.2, or 73.3, or 73.4, or 73.5, or 73.6, or 73.7, or 73.8, or 73.9, or 74, or 74.1, or 74.2, or 74.3, or 74.4, or 74.5, or 74.6, or 74.7, or 74.8, or 74.9, or 75, or 75.1, or 75.2, or 75.3, or 75.4, or 75.5, or 75.6, or 75.7, or 75.8, or 75.9, or 76, or 76.1, or 76.2, or 76.3, or 76.4, or 76.5, or 76.6, or 76.7, or 76.8, or 76.9, or 77, or 77.1, or 77.2, or 77.3, or 77.4, or 77.5, or 77.6, or 77.7, or 77.8, or 77.9, or 78, or 78.1, or 78.2, or 78.3, or 78.4, or 78.5, or 78.6, or 78.7, or 78.8, or 78.9, or 79, or 79.1, or 79.2, or 79.3, or 79.4, or 79.5, or 79.6, or 79.7, or 79.8, or 79.9, or 80, or 80.1, or 80.2, or 80.3, or 80.4, or 80.5, or 80.6, or 80.7, or 80.8, or 80.9, or 81, or 81.1, or 81.2, or 81.3, or 81.4, or 81.5, or 81.6, or 81.7, or 81.8, or 81.9, or 82, or 82.1, or 82.2, or 82.3, or 82.4, or 82.5, or 82.6, or 82.7, or 82.8, or 82.9, or 83, or 83.1, or 83.2, or 83.3, or 83.4, or 83.5, or 83.6, or 83.7, or 83.8, or 83.9, or 84, or 84.1, or 84.2, or 84.3, or 84.4, or 84.5, or 84.6, or 84.7, or 84.8, or 84.9, or 85, or 85.1, or 85.2, or 85.3, or 85.4, or 85.5, or 85.6, or 85.7, or 85.8, or 85.9, or 86, or 86.1, or 86.2, or 86.3, or 86.4, or 86.5, or 86.6, or 86.7, or 86.8, or 86.9, or 87, or 87.1, or 87.2, or 87.3, or 87.4, or 87.5, or 87.6, or 87.7, or 87.8, or 87.9, or 88, or 88.1, or 88.2, or 88.3, or 88.4, or 88.5, or 88.6, or 88.7, or 88.8, or 88.9, or 89, or 89.1, or 89.2, or 89.3, or 89.4, or 89.5, or 89.6, or 89.7, or 89.8, or 89.9, or 90, or 90.1, or 90.2, or 90.3, or 90.4, or 90.5, or 90.6, or 90.7, or 90.8, or 90.9, or 91, or 91.1, or 91.2, or 91.3, or 91.4, or 91.5, or 91.6, or 91.7, or 91.8, or 91.9, or 92, or 92.1, or 92.2, or 92.3, or 92.4, or 92.5, or 92.6, or 92.7, or 92.8, or 92.9, or 93, or 93.1, or 93.2, or 93.3, or 93.4, or 93.5, or 93.6, or 93.7, or 93.8, or 93.9, or 94, or 94.1, or 94.2, or 94.3, or 94.4, or 94.5, or 94.6, or 94.7, or 94.8, or 94.9, or 95, or 95.1, or 95.2, or 95.3, or 95.4, or 95.5, or 95.6, or 95.7, or 95.8, or 95.9, or 96, or 96.1, or 96.2, or 96.3, or 96.4, or 96.5, or 96.6, or 96.7, or 96.8, or 96.9, or 97, or 97.1, or 97.2, or 97.3, or 97.4, or 97.5, or 97.6, or 97.7, or 97.8, or 97.9, or 98, or 98.1, or 98.2, or 98.3, or 98.4, or 98.5, or 98.6, or 98.7, or 98.8, or 98.9, or 99, or 99.1, or 99.2, or 99.3, or 99.4, or 99.5, or 99.6, or 99.7, or 99.8, or 99.9, or 100, or 100.1, or 100.2, or 100.3, or 100.4, or 100.5, or 100.6, or 100.7, or 100.8, or 100.9, or 101, or 101.1, or 101.2, or 101.3, or 101.4, or 101.5, or 101.6, or 101.7, or 101.8, or 101.9, or 102, or 102.1, or 102.2, or 102.3, or 102.4, or 102.5, or 102.6, or 102.7, or 102.8, or 102.9, or 103, or 103.1, or 103.2, or 103.3, or 103.4, or 103.5, or 103.6, or 103.7, or 103.8, or 103.9, or 104, or 104.1, or 104.2, or 104.3, or 104.4, or 104.5, or 104.6, or 104.7, or 104.8, or 104.9, or 105, or 105.1, or 105.2, or 105.3, or 105.4, or 105.5, or 105.6, or 105.7, or 105.8, or 105.9, or 106, or 106.1, or 106.2, or 106.3, or 106.4, or 106.5, or 106.6, or 106.7, or 106.8, or 106.9, or 107, or 107.1, or 107.2, or 107.3, or 107.4, or 107.5, or 107.6, or 107.7, or 107.8, or 107.9, or 108, or 108.1, or 108.2, or 108.3, or 108.4, or 108.5, or 108.6, or 108.7, or 108.8, or 108.9, or 109, or 109.1, or 109.2, or 109.3, or 109.4, or 109.5, or 109.6, or 109.7, or 109.8, or 109.9, or 110, or 110.1, or 110.2, or 110.3, or 110.4, or 110.5, or 110.6, or 110.7, or 110.8, or 110.9, or 111, or 111.1, or 111.2, or 111.3, or 111.4, or 111.5, or 111.6, or 111.7, or 111.8, or 111.9, or 112, or 112.1, or 112.2, or 112.3, or 112.4, or 112.5, or 112.6, or 112.7, or 112.8, or 112.9, or 113, or 113.1, or 113.2, or 113.3, or 113.4, or 113.5, or 113.6, or 113.7, or 113.8, or 113.9, or 114, or 114.1, or 114.2, or 114.3, or 114.4, or 114.5, or 114.6, or 114.7, or 114.8, or 114.9, or 115, or 115.1, or 115.2, or 115.3, or 115.4, or 115.5, or 115.6, or 115.7, or 115.8, or 115.9, or 116, or 116.1, or 116.2, or 116.3, or 116.4, or 116.5, or 116.6, or 116.7, or 116.8, or 116.9, or 117, or 117.1, or 117.2, or 117.3, or 117.4, or 117.5, or 117.6, or 117.7, or 117.8, or 117.9, or 118, or 118.1, or 118.2, or 118.3, or 118.4, or 118.5, or 118.6, or 118.7, or 118.8, or 118.9, or 119, or 119.1, or 119.2, or 119.3, or 119.4, or 119.5, or 119.6, or 119.7, or 119.8, or 119.9, or 120, or 120.1, or 120.2, or 120.3, or 120.4, or 120.5, or 120.6, or 120.7, or 120.8, or 120.9, or 121, or 121.1, or 121.2, or 121.3, or 121.4, or 121.5, or 121.6, or 121.7, or 121.8, or 121.9, or 122, or 122.1, or 122.2, or 122.3, or 122.4, or 122.5, or 122.6, or 122.7, or 122.8, or 122.9, or 123, or 123.1, or 123.2, or 123.3, or 123.4, or 123.5, or 123.6, or 123.7, or 123.8, or 123.9, or 124, or 124.1, or 124.2, or 124.3, or 124.4, or 124.5, or 124.6, or 124.7, or 124.8, or 124.9, or 125, or 125.1, or 125.2, or 125.3, or 125.4, or 125.5, or 125.6, or 125.7, or 125.8, or 125.9, or 126, or 126.1, or 126.2, or 126.3, or 126.4, or 126.5, or 126.6, or 126.7, or 126.8, or 126.9, or 127, or 127.1, or 127.2, or 127.3, or 127.4, or 127.5, or 127.6, or 127.7, or 127.8, or 127.9, or 128, or 128.1, or 128.2, or 128.3, or 128.4, or 128.5, or 128.6, or 128.7, or 128.8, or 128.9, or 129, or 129.1, or 129.2, or 129.3, or 129.4, or 129.5, or 129.6, or 129.7, or 129.8, or 129.9, or 130, or 130.1, or 130.2, or 130.3, or 130.4, or 130.5, or 130.6, or 130.7, or 130.8, or 130.9, or 131, or 131.1, or 131.2, or 131.3, or 131.4, or 131.5, or 131.6, or 131.7, or 131.8, or 131.9, or 132, or 132.1, or 132.2, or 132.3, or 132.4, or 132.5, or 132.6, or 132.7, or 132.8, or 132.9, or 133, or 133.1, or 133.2, or 133.3, or 133.4, or 133.5, or 133.6, or 133.7, or 133.8, or 133.9, or 134, or 134.1, or 134.2, or 134.3, or 134.4, or 134.5, or 134.6, or 134.7, or 134.8, or 134.9, or 135, or 135.1, or 135.2, or 135.3, or 135.4, or 135.5, or 135.6, or 135.7, or 135.8, or 135.9, or 136, or 136.1, or 136.2, or 136.3, or 136.4, or 136.5, or 136.6, or 136.7, or 136.8, or 136.9, or 137, or 137.1, or 137.2, or 137.3, or 137.4, or 137.5, or 137.6, or 137.7, or 137.8, or 137.9, or 138, or 138.1, or 138.2, or 138.3, or 138.4, or 138.5, or 138.6, or 138.7, or 138.8, or 138.9, or 139, or 139.1, or 139.2, or 139.3, or 139.4, or 139.5, or 139.6, or 139.7, or 139.8, or 139.9, or 140, or 140.1, or 140.2, or 140.3, or 140.4, or 140.5, or 140.6, or 140.7, or 140.8, or 140.9, or 141, or 141.1, or 141.2, or 141.3, or 141.4, or 141.5, or 141.6, or 141.7, or 141.8, or 141.9, or 142, or 142.1, or 142.2, or 142.3, or 142.4, or 142.5, or 142.6, or 142.7, or 142.8, or 142.9, or 143, or 143.1, or 143.2, or 143.3, or 143.4, or 143.5, or 143.6, or 143.7, or 143.8, or 143.9, or 144, or 144.1, or 144.2, or 144.3, or 144.4, or 144.5, or 144.6, or 144.7, or 144.8, or 144.9, or 145, or 145.1, or 145.2, or 145.3, or 145.4, or 145.5, or 145.6, or 145.7, or 145.8, or 145.9, or 146, or 146.1, or 146.2, or 146.3, or 146.4, or 146.5, or 146.6, or 146.7, or 146.8, or 146.9, or 147, or 147.1, or 147.2, or 147.3, or 147.4, or 147.5, or 147.6, or 147.7, or 147.8, or 147.9, or 148, or 148.1, or 148.2, or 148.3, or 148.4, or 148.5, or 148.6, or 148.7, or 148.8, or 148.9, or 149, or 149.1, or 149.2, or 149.3, or 149.4, or 149.5, or 149.6, or 149.7, or 149.8, or 149.9, or 150, or 150.1, or 150.2, or 150.3, or 150.4, or 150.5, or 150.6, or 150.7, or 150.8, or 150.9, or 151, or 151.1, or 151.2, or 151.3, or 151.4, or 151.5, or 151.6, or 151.7, or 151.8, or 151.9, or 152, or 152.1, or 152.2, or 152.3, or 152.4, or 152.5, or 152.6, or 152.7, or 152.8, or 152.9, or 153, or 153.1, or 153.2, or 153.3, or 153.4, or 153.5, or 153.6, or 153.7, or 153.8, or 153.9, or 154, or 154.1, or 154.2, or 154.3, or 154.4, or 154.5, or 154.6, or 154.7, or 154.8, or 154.9, or 155, or 155.1, or 155.2, or 155.3, or 155.4, or 155.5, or 155.6, or 155.7, or 155.8, or 155.9, or 156, or 156.1, or 156.2, or 156.3, or 156.4, or 156.5, or 156.6, or 156.7, or 156.8, or 156.9, or 157, or 157.1, or 157.2, or 157.3, or 157.4, or 157.5, or 157.6, or 157.7, or 157.8, or 157.9, or 158, or 158.1, or 158.2, or 158.3, or 158.4, or 158.5, or 158.6, or 158.7, or 158.8, or 158.9, or 159, or 159.1, or 159.2, or 159.3, or 159.4, or 159.5, or 159.6, or 159.7, or 159.8, or 159.9, or 160, or 160.1, or 160.2, or 160.3, or 160.4, or 160.5, or 160.6, or 160.7, or 160.8, or 160.9, or 161, or 161.1, or 161.2, or 161.3, or 161.4, or 161.5, or 161.6, or 161.7, or 161.8, or 161.9, or 162, or 162.1, or 162.2, or 162.3, or 162.4, or 162.5, or 162.6, or 162.7, or 162.8, or 162.9, or 163, or 163.1, or 163.2, or 163.3, or 163.4, or 163.5, or 163.6, or 163.7, or 163.8, or 163.9, or 164, or 164.1, or 164.2, or 164.3, or 164.4, or 164.5, or 164.6, or 164.7, or 164.8, or 164.9, or 165, or 165.1, or 165.2, or 165.3, or 165.4, or 165.5, or 165.6, or 165.7, or 165.8, or 165.9, or 166, or 166.1, or 166.2, or 166.3, or 166.4, or 166.5, or 166.6, or 166.7, or 166.8, or 166.9, or 167, or 167.1, or 167.2, or 167.3, or 167.4, or 167.5, or 167.6, or 167.7, or 167.8, or 167.9, or 168, or 168.1, or 168.2, or 168.3, or 168.4, or 168.5, or 168.6, or 168.7, or 168.8, or 168.9, or 169, or 169.1, or 169.2, or 169.3, or 169.4, or 169.5, or 169.6, or 169.7, or 169.8, or 169.9, or 170, or 170.1, or 170.2, or 170.3, or 170.4, or 170.5, or 170.6, or 170.7, or 170.8, or 170.9, or 171, or 171.1, or 171.2, or 171.3, or 171.4, or 171.

SCOTTISH METEOROLOGICAL SOCIETY.

Observations taken at Præmar, County of Argyll, in Lat. 57° 16', Long. 5° 24', Distance from Sea 60 miles.Height of Cistern of the Barometer above Mean Sea-level 114 feet, above Ground 5 feet.During the MONTH of May 1872.

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.				SUNSHINE. Hours.	THERMOMETERS under Ground.			SEA.	OZONE.	GENERAL REMARKS. As to occurrence of Thunder, Lightning, Storms, Hail, Meteors, Remarkable Depression or Elevation of Barometer, Prevalent Diseases, etc. 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.			9 h. A.M.		9 h. P.M.			9 h. A.M.																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																									
		Barometer.	Attach- ed Ther- mometer	Barometer.	Attach- ed Ther- mometer	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.		Readings of the H. Chip Anemometer No. _____	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. _____	No. _____	No. _____																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																
		* No.		No.		No.	No.	No.	No.																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																								

BAROMETER, “corrected Mean” at 9 A.M., minus the Correction†† = 28.605
for Temp. (Col. 2), = 28.647..... 0.042.....

“Corrected Mean” of Barometer at 9 P.M., minus the Correction†† = 28.620
for Temp. (Col. 4), = 28.657..... 0.037.....

Mean at Station, corrected, and at 32°..... = 28.612

Correction for height, feet above Mean Sea-level..... = 1.202

Mean, reduced to 32°, and Sea-level..... = 29.814

Highest Reading, corrected for Index error, on the 10 th..... = 29.126

Lowest Do. Do., on the 4 th..... = 27.704

Difference, or Monthly Range..... = 1.422

S.-R. THERMOMETER, (in shade, etc.), Highest in Month, (corrected for Index Errors), on the 27 th..... = 61.8

Lowest in Month, corrected for Index errors, on the 19 th..... = 28.6

Difference, or Monthly Range..... = 33.2

“Corrected Mean” of all the Highest, (Col. 5),..... = 51.6

“Corrected Mean” of all the Lowest, (Col. 6),..... = 35.2

Difference, or Mean Daily Range..... = 13.4

“Calculated Mean Temperature of Month..... = 44.9

S.-R. THERMOMETER, Black Bulb in Sun, Highest, (corrected for Index Errors), on the 24 th..... = 117.3

“Corrected Mean,” (Col. 7), of Black Bulb, Max. in Sun..... = 43.82

Lowest at Night, Black Bulb, (corrected for Index errors), on the 19 th..... = 26.0

“Corrected Mean,” (Col. 8), of Black Bulb, Min. on grass..... = 35.0

Difference of above Means or Range (“exposed”),..... = 89.5

HYGROMETER, Mean (corrected) A.M. and P.M. Reading of Dry Bulb, (Cols. 9 and 11),..... = 44.0

Mean (corrected) A.M. and P.M. Reading of Wet Bulb, (Cols. 10 and 12),..... = 41.7

† Computed Temperature of Dew-Point..... = 34.2

† Do. Elastic Force of Vapour..... = 238

† Do. Weight of Vapour in a Cubic Foot of Air, ... = 82

† Relative Humidity, (Saturation = 100),..... = 82

RAIN fell on 23 Days; Amount in Inches,..... = 3.41

WIND.		SUMMARY.					
Direction.	N	NE	E	SE	S	SW	W
A.M.	4	7	1	2	4	7	3
P.M.	3	7	4	3	2	10	2
Mean.	4	7	2	3	3	8	2

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

Observations made and
Return verified by

James Ritchie

(Signed)

James Ritchie

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

Hour of Observation.—The Council recommend that Observations be made precisely at 9 o'clock (Greenwich or Railway Time 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-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 constructed by Mr. Aitch 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, 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 horn, whose stem passes freely through the lid and case of the cistern. When the *index* lies on this little piston-rod is brought, by the adjusting screw, to form one straight line with those on its ivory frame, the scale is graduated. In taking an observation, this *preliminary* setting must be made with scrupulous accuracy; a slight error here will vitiate the readings from the *evening*.

When a Barometer having adjustable surfaces has to be removed from its fastenings, the ivory peg must be screwed so as to form a tight plug to the cistern. Then *reverse* up the mercury to within a quarter of an inch of the top of the tube, and take down the instrument; it may then be carried with the cistern uppermost. Before suspending the Barometer for use, it must be ascertained whether the space above the mercury in the tube is a complete vacuum; this is the case when, on inclining the instrument so that the mercury strikes the top of the tube, a *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 *lytle*, 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 venting, 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 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 the door opening to the south. These Boxes may be had from the opticians, Self-registering Thermometers.—Professor Phillips, 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 the Rutherford is recommended when graduated on the glass stem and affixed to a frame separate from the "Maximum." This Thermometer is liable to two demerits, 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 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 in contact with the body of the liquid. These instruments should be hung horizontally.

The above remarks apply equally to the Thermometers for registering the greatest heat from the sun's rays, and the least

from radiation during night. Their bulbs have a black coating which may easily be made, or mounted, by the application of a shallow blacked box, whose sides protect the bulbs from 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 are *not graduated* on the stem, but merely on an attached scale, undergo repairs, they are very liable to be moved from their position on the Scale, and ought never afterwards to be used, without being *re-tested*. The self-registering and especially the "Minimum" Thermometers ought frequently to be compared with the dry bulb of the Hygrometer. The freezing-point of each Thermometer (marked by a scratch on the tube) ought to be tested once a year, in snow or melting ice. For comparison of Thermometers, a properly tested Thermometer may be had, on loan, by any observer, from the Meteorological Secretary.

The Hygrometer consists of two Thermometers usually, but not necessarily, mounted on one frame. As apparently slight deviations from the approved and *well-tested* form of this apparatus seriously vitiate the "Hygrometric 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 bulb;—the mullin 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 mullin 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 film of ice thus formed evaporation. One form of "Maxson'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 putting 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—38°·4, 40°·0, or 40°·1; or again, 40°·4, 40°·3, 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 40½, 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 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 schedules, the indications registered on the 24 are those of a series of phenomena commencing at 9 P.M. on the 24, and extending till 9 P.M. on the 34.

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.

Cloud observations ought to be made on the changes in the direction of the wind, and during storms it is earnestly recommended that extra observations be made at every hour of Greenwiche time. Such a system of simultaneous observations 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 unknown situation for observation and partly from the defective nature of the instruments used. It is, indeed, difficult to obtain an unexceptionable point 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," and the letter S affixed to the depth of water received in gauges. The depth of the snow must be measured in some open place where no drift is observed, and registered in addition to, and as a check upon, the indications of the rain-gauge. For wind, rain, and snow, as indicated in every column, the observer cannot be too careful to register observations only, and nothing that partakes of the nature of deduction or inference.

Clouds.—Convenient abbreviations for Luise Howard's

omenclature of clouds will be found on the other side. The amount of cloud in the atmosphere ought to be estimated from the greatest or less obscuration of the sky overhead (i.e., within 20° or 30° of the zenith). The strata of clouds that appear near the horizon are viewed obliquely; and thus, being unable to judge of their amount, we ought not to take them into account in the clouds column, though their appearances and changes ought to be noted among the "Remarks." The amount of cloud is entered on a scale of 0 to 10; thus, when the sky overhead is *half covered* by clouds, 5 is entered as the *observation*, and so on. Observations of the clouds are made at 9 A.M. and at sunset, as illustrating the condition and currents of the upper and lower regions of the atmosphere. The entries in the schedule are to be made in the following manner:—In the column "Velocity 6, S. W."

and Direction, $\frac{2}{W}$, (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 $\frac{2}{4}$, (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 *pro* or *con* 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 20th, 15th, and 20th 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 Schomburgk's or Moritz's papers are used. The paper is affixed by a pin to a board in the thermometer box, and the indication registered at 9 A.M. and 9 P.M. It is desired that these indications be registered in connection with the force and direction of the wind at the time of observation, in the following manner:—thus 3^{xx}, 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 *flowing freely*.

Electricity.—Too much importance cannot be attached to electric condition of the atmosphere in connection with terrestrial magnetism, and as a meteorological phenomenon. A proper Electrometer is necessary to every complete meteorological observatory.

Remarks.—The "Remarks" column is too narrow, but unavoidably so. Some of the most valuable observations that can be taken are those for which no rules can be given nor hours assigned. The use of contractions ought, therefore, to be taken every day. Signs of contractions of such as are recognized 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 the column to prevent 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 mists, 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 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 or on the side margin. Additional remarks may be made on the side margin.

"Observations in connection with the periodic return of the seasons" possess not only great scientific value, but are of considerable interest to the agriculturist. The Council would direct the special attention of Observers to the registration of such phenomena; that the published Summaries may fairly represent the whole of Scotland. Observation ought to be confined to individual trees and shrubs; to particular species of birds, and, in the case of crops, to specified sorts reared from year to year on a selected piece of ground or farm.

The Council recommend that *ten 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, 10th November 1870.

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

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

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., in or perfection; whether any have suffered from blight, disease, etc. Whether Epizootic disease prevails among cattle; and the Agricultural condition of the district generally.

Edinburgh, May 1872
General Post Office Buildings,
Secretary of the Meteorological Society of Scotland,
MR ALEXANDER BUCHAN,
BOOK-POST.
Blaenau
May 1872
Edinburgh
JUN 10 1872

SCOTTISH METEOROLOGICAL SOCIETY.

Observations taken at Braemar, County of Aberdeen, in Lat. 57° 14', Long. 5° 24' W, Distance from Sea 60 miles.
Height of Cistern of the Barometer above Mean Sea-level 1114 feet, above Ground 5 feet. During the MONTH of July 1872.
The Hours of Observation are of Greenwich Time.

ELECTRICITY.	BAROMETER.		SELF-REGISTERING THERMOMETERS.				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.		9 A.M.		P.M.		9 h. A.M.										
	Barometer.	Attached Thermometer.	Barometer.	Attached Thermometer.	Max. No.	Min. No.	Max. No.	Min. No.	Dry bulb.	Wet bulb.	Dry bulb.	Wet bulb.	Direction.	Force.	Direction.	Force.	Amount (0-10).	Amount (0-10).	Amount (0-10).	Amount (0-10).	No. 1.	No. 2.	No. 3.								
	Inches.	°	Inches.	°																											
1	28.500		28.600		63.4	52.8	44.8	49.2	54.8	52.3	52.8	52.0	SW	0.5	SW	0.5														1	
2	28.712		28.876		68.3	50.8	42.8	47.8	60.8	55.1	54.8	50.0	SW	0	SW	0														2	
3	28.956		28.954		71.0	42.3	32.3	38.8	61.0	58.0	58.3	56.0	SW	0	SW	0.2														3	
4	28.984		29.020		74.8	38.2	28.2	35.3	65.0	61.0	63.8	60.7	SW	1	SW	0.5														4	
5	28.954		28.772		74.0	60.8	42.3	55.3	69.9	62.0	63.2	57.7	SW	0	S	1.5														5	
6	28.782		28.900		67.0	52.0	40.2	51.4	57.2	54.0	52.3	51.3	SW	0.5	SW	0														6	
7	28.712		28.802		55.1	49.2	37.3	48.0	53.1	52.0	49.5	48.8	SW	0	E	0.5														7	
8	28.622		28.500		62.1	49.0	32.8	48.8	54.0	55.1	54.0	53.8	SW	0.5	SW	0														8	
9	28.574		28.650		59.9	47.3	30.8	44.3	53.7	51.7	51.0	48.8	SW	1.5	SW	1														9	
10	28.712		28.700		63.8	41.0	20.0	34.2	57.0	54.8	53.8	50.2	S	0.5	S	1														10	
11	28.742		28.744		57.7	50.0	35.5	47.0	56.2	54.8	55.2	53.2	SW	0.5	SW	0.5															11
12	28.806		28.834		52.8	54.0	47.3	53.8	56.2	56.0	57.8	57.0	SW	0.5	SW	0.5															12
13	28.910		28.912		67.0	44.0	25.5	38.0	61.0	56.2	57.0	55.0	SW	0	E	1															13
14	28.922		28.892		63.8	50.2	46.3	46.8	54.9	54.0	51.0	48.0	SW	0.3	E	1															14
15	28.884		28.830		67.3	43.3	34.4	43.7	50.0	50.0	64.0	52.9	SW	0.5	SW	1															15
16	28.774		28.720		60.8	49.8	30.2	46.7	56.0	57.0	64.2	66.6	SW	1	SW	0.5															16
17	28.788		28.768		65.0	42.8	21.3	37.0	52.0	48.0	53.2	48.0	SW	0.2	SW	0.5															17
18	28.764		28.824		63.8	46.0	20.0	32.0	54.2	48.3	52.0	50.3	S	0	SW	0.2															18
19	28.870		28.900		61.2	40.0	14.1	35.3	57.0	52.0	54.0	51.0	SW	0	S	1.5															19
20	28.924		28.772		61.0	50.3	32.0	43.2	55.2	54.0	60.2	58.8	SW	0	SW	1.5															20
21	28.800		28.800		68.7	58.2	47.2	52.2	64.8	61.7	63.0	62.0	S	1.5	S	0															21
22	28.680		28.590		67.3	51.3	41.0	47.3	63.0	60.3	56.7	55.1	SW	0.5	SW	0.5															22
23	28.700		28.750		67.8	47.4	31.3	46.8	63.7	58.2	58.0	55.3	SW	1.5	SW	0															23
24	28.850		28.900		74.5	52.9	39.2	49.7	66.3	62.8	61.8	59.2	SW	0	SW	0.5															24
25	29.002		28.950		66.0	58.3	40.0	45.7	61.3	59.2	58.0	56.3	SW	0	SW	0.5															25
26	28.980		28.950		61.0	53.0	38.2	48.8	56.8	54.8	55.8	55.2	SW	0.5	SW	0.5															26
27	28.886		28.880		64.0	51.2	35.2	40.2	54.8	54.0	59.8	59.5	SW	0.2	SW	0.2															27
28	28.830		28.850		74.3	50.1	28.3	48.0	64.4	61.2	64.0	63.0	SW	0	SW	1.2															28
29	28.750		28.780		70.8	49.0	27.7	41.2	64.7	61.8	54.0	53.0	E	0	SW	0.5															29
30	28.800		28.800		59.2	46.3	35.3	46.2	49.3	45.8	50.8	46.8	SW	1	SW	1															30
31	28.800		28.882		55.8	46.2	31.8	44.8	50.0	46.2	44.8	48.0	SW	0.5	SW	0															31
Sum.	25.044		25.222		147.9	29.7	150.7	200.4	261.8	144.3	191.3	112.8	128		15.3		2.38	200	234												
Means.	28.808		28.814		64.8	49.6	104.9	46.3	58.4	54.7	56.2	53.6	0.41		0.58		6.4	7.6													
† Total Corrections for Instrumental Errors.	-0.09		-0.09						-1		-1		0-6					7.0													
† Corrections for Diurnal Range.																															
"Corrected Means."	28.799		28.805						54.6		53.5																				
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	31

BAROMETER, "corrected Mean" at 9 A.M., minus the Correction†† = 28.722
for Temp. (Col. 2), = 28.722 - 0.071 = 28.651
"Corrected Mean" of Barometer at 9 P.M., minus the Correction†† = 28.733
for Temp. (Col. 4), = 28.805 - 0.072 = 28.733
Mean at Station, corrected, and at 32°, = 28.728
Correction for height, feet above Mean Sea-level, = 1.202
Mean, reduced to 32°, and Sea-level, = 29.930
Highest Reading, corrected for Index error, on the 4th, = 29.020
Lowest Do. Do. on the 8th, = 28.520
Difference, or Monthly Range, = 0.520

S.-R. THERMOMETER, (in shade, etc.), Highest in Month, (corrected for Index Errors), on the 4th, = 74.8
Lowest in Month, corrected for Index errors, on the 18th, = 36.0
Difference, or Monthly Range, = 38.8
"Corrected Mean" of all the Highest, (Col. 5), = 64.8
"Corrected Mean" of all the Lowest, (Col. 6), = 49.6
Difference, or Mean Daily Range, = 15.2
** Calculated Mean Temperature of Month, = 57.2
S.-R. THERMOMETER, Black Bulb in Sun, Highest, (corrected for Index Errors), on the 3th, = 132.3
"Corrected Mean," (Col. 7), of Black Bulb, Max. in Sun, = 104.9
Lowest at Night, Black Bulb, (corrected for Index errors), on the 18th, = 32.0
"Corrected Mean," (Col. 8), of Black Bulb, Min. on grass, = 46.3
Difference of above Means or Range ("exposed"), = 58.4

HYGROMETER, Mean (corrected) A.M. and P.M. Reading of Dry Bulb, (Cols. 9 and 11), = 57.3
Mean (corrected) A.M. and P.M. Reading of Wet Bulb, (Cols. 10 and 12), = 54.0
†† Computed Temperature of Dew-Point, = 51.0
†† Do. Elastic Force of Vapour, = 3.74
†† Do. Weight of Vapour in a Cubic Foot of Air, = 8.0
†† Relative Humidity, (Saturation = 100), = 80
RAIN fell on 15 Days; Amount in Inches, = 2.38

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

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

Observations made and
Return verified by

(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 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 should 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 for Meteorological purposes.

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

When a Barometer having adjustable surfaces has to be removed from its fastenings, the ivory peg must be screwed so as to form a tight plug to the cistern. Then *serve up* the mercury to within a quarter of an inch of the top of the tube and take down the instrument; it may then be carried with the cistern uppermost. Before suspending the Barometer for use, it must be ascertained whether the space above the mercury in the tube is a complete vacuum; this is the case when, on inclining the instrument, so that the mercury strikes the top of the tube, a *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 *lytle*, 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 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 latitudes burning 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 opticians.

Self-registering Thermometers.—Professors Phillips, and Negretti and Zambra Patent "Minimum" Thermometers are recommended: printed directions for their use may be obtained with each instrument. The "Minimum" Thermometer of Katherford is recommended when graduated on the glass stem and affixed to a frame separate from the "Maximum." This Thermometer is liable to two derangements, both of which must be guarded against, and may be easily remedied by an observer. When the *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 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 in contact with the body of the liquid. These statements 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 marked, by the application of a mixture of lamp black and primer's ink. They are placed in shallow blackened boxes, whose sides protect the bulbs from the sun's rays. 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 are not *not graduated* on the stem, but merely on an attached scale, mended 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-cool 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 made of animal 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 most cold in ordinary circumstances.

One form of "Hygrometer" is enclosed in a tin case, which also supports the water-cool 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 recommended requirements shall be complied with, as far as possible.

Reading of the Thermometer.—Great care must be taken to avoid the effects of refraction, by bringing the eye exactly opposite the tip of the index, or *column* of mercury. The reading ought to be taken to tenths of a degree, and noted in decimals. Thus the Thermometer will be read—39.9, 40.0, or 40.1; or again, 40.4, 40.5, or 40.6, according as it indicates a little under, an exact coincidence with, or a little over 40°, or 40½°, respectively. So also 41½°, and 40½°, more or less must be registered 40.2 or 40.3, and 40.7 or 40.8 respectively. In reading Ruthen'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, their extremes may occur at any hour; and it is necessary to refer their occurrence to their proper meteorological day. In the Society's schedules, the indications registered on the 8d 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 erected 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, etc.

Careful observations ought to be made on the changes in the direction of the wind; and during storms, it is earnestly 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 unfavorable 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 rain columns, under the following conditions.—When a Snow shower occurs it must be noted in the "Remarks," and the latter S affixed to the depth of water received in gauges. 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 windy, rainy, 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 clouds column, though their appearance and changes ought to be noted among the "Remarks." The amount of cloud is entered from a scale of 0 to 10; thus, when the sky overhead is *half covered* by clouds, 5 is entered as the *observation*, and so on.

Observations of the clouds are made at 9 a.m. and at sunset, as illustrating the condition and currents of the upper and lower regions of the atmosphere. The entries in the schedule are to be made in the following manner:—In the column "Velocity and Direction," $\frac{2}{6}$ S. 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 $\frac{2}{4}$ (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 *peculiar* 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 land, a very important branch of Meteorology. The Council, therefore recommend that the temperature of the sea be carefully taken by a properly constructed apparatus, from the ends of piers and rocks round the coast, where it is not influenced by that of river water. At or near the time of high water, on the 5th, 15th, and 25th of each month, the thermometer ought to be sunk exactly six feet (one fathom), and after ten minutes have elapsed, drawn up and read. When convenient, extra sea observations might be taken for other and greater depths, noting always the temperature of the air, and the hour of observation; and continuing to observe for particular depths.

Temperature of Wells.—The temperature of the water at the bottoms of wells ought, when practicable, to be taken, and the depth of the well and of the water noted.

Ozone.—Mention whether Schombert's or Mollat's papers are used. The paper is affixed by a pin to a board in the thermometer box, and the indication registered at 9 a.m. and 9 p.m. It is desired that these indications be registered in connection with the force and direction of the wind at the time of observation, in the following manner:—thus 3 p.m., as an *ozone* entry in the schedule, will indicate that the ozone paper is tinted as "3" on the scale, that the wind is from the N.W., and that its force on the scale 0—6 is "4"; *i.e.*, that it is *blowing fresh*.

Electricity.—Too much importance cannot be attached to electric condition of the atmosphere in connection with terrestrial magnetism, and as a meteorological phenomenon. A proper Electrometer is necessary to every complete meteorological observatory.

Remarks.—The "Remarks" column is too narrow, but unfortunately 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 recognized and in use at Greenwich, and Southampton, are given at the foot of the column. Besides special and extraordinary observations, great prominence ought to be given in this column to prevalent diseases, differences in character, colour, velocity, and direction between the lower and upper strata of clouds, the colour of the sky, etc. Remarks ought to be made on the occurrence of 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 unoccupied, or in two ruled off for the purposes, from that headed "Remarks." It is intended that observations by the Electrometer should be entered in this manner or on the side-margin. Additional remarks may be made on the side-margin.

"Observations in connection with the periodic return of the seasons," possess not only great scientific value, but are of considerable interest to the Agriculturist. The Council would direct the special attention of Observers to the registration of such phenomena; that the published Summaries may fairly represent the whole of Scotland. Observation ought to be confined to individual trees and shrubs; to particular species of birds; and, in the case of crops, to specified sorts reared from year to year on a selected piece of ground or farm.

The Council recommend that *ten 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, 10th November 1870.

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,		
Bontree 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,							

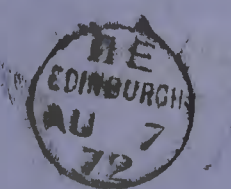
Have the goodness also to state any information you may be able to collect relative to the Crops of Grain, Hay, Potatoes, Turnips, Fruits, etc., in perfection; whether any have suffered from blight, disease, etc. Whether Epizootic disease prevails among cattle; and the Agricultural condition of the district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

EDINBURGH

General Post Office Buildings,
Secretary of the Meteorological Society of Scotland,

MR ALEXANDER BUCHAN,

BOOK-POST.



SCOTTISH METEOROLOGICAL SOCIETY.

Observations taken at Barnum, County of Abertoe, in Lat. 57° 11', Long. 2° 24', Distance from Sea 6 miles.
Height of Cistern of the Barometer above Mean Sea-level 414 feet, above Ground 0 feet. During the MONTH of August 1872.
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.		9 h. A.M.		9 h. P.M.																																																																																																																																																																																																																																																																																																									
		Barometer.	Attached Ther- mometer.	Barometer.	Attached Ther- mometer.	Max. No.	Min. No.	Max. in Sun's rays.	Min. on Grass.	Dry bulb.	Wet bulb.	Dry bulb.	Wet bulb.	Direction.	Force.	Direction.	Force.	No. of hours in which it fell.	Amount in inches.	Velocity (0-4), and Direction.	Amount (0-10), and Direction.	Velocity (0-4), and Direction.					Amount (0-10), and Direction.	Velocity (0-4), and Direction.	Amount (0-10), and Direction.	Velocity (0-4), and Direction.	Amount (0-10), and Direction.	Velocity (0-4), and Direction.	Amount (0-10), and Direction.	Velocity (0-4), and Direction.	Amount (0-10), and Direction.	Velocity (0-4), and Direction.	Amount (0-10), and Direction.	Velocity (0-4), and Direction.	Amount (0-10), and Direction.	Velocity (0-4), and Direction.	Amount (0-10), and Direction.	Velocity (0-4), and Direction.	Amount (0-10), and Direction.	Velocity (0-4), and Direction.	Amount (0-10), and Direction.	Velocity (0-4), and Direction.	Amount (0-10), and Direction.	Velocity (0-4), and Direction.	Amount (0-10), and Direction.	Velocity (0-4), and Direction.	Amount (0-10), and Direction.	Velocity (0-4), and Direction.	Amount (0-10), and Direction.	Velocity (0-4), and Direction.	Amount (0-10), and Direction.	Velocity (0-4), and Direction.	Amount (0-10), and Direction.	Velocity (0-4), and Direction.	Amount (0-10), and Direction.	Velocity (0-4), and Direction.	Amount (0-10), and Direction.	Velocity (0-4), and Direction.	Amount (0-10), and Direction.	Velocity (0-4), and Direction.	Amount (0-10), and Direction.	Velocity (0-4), and Direction.	Amount (0-10), and Direction.	Velocity (0-4), and Direction.	Amount (0-10), and Direction.	Velocity (0-4), and Direction.	Amount (0-10), and Direction.	Velocity (0-4), and Direction.	Amount (0-10), and Direction.	Velocity (0-4), and Direction.	Amount (0-10), and Direction.	Velocity (0-4), and Direction.	Amount (0-10), and Direction.	Velocity (0-4), and Direction.	Amount (0-10), and Direction.	Velocity (0-4), and Direction.	Amount (0-10), and Direction.	Velocity (0-4), and Direction.	Amount (0-10), and Direction.	Velocity (0-4), and Direction.	Amount (0-10), and Direction.	Velocity (0-4), and Direction.	Amount (0-10), and Direction.	Velocity (0-4), and Direction.	Amount (0-10), and Direction.	Velocity (0-4), and Direction.	Amount (0-10), and Direction.	Velocity (0-4), and Direction.	Amount (0-10), and Direction.	Velocity (0-4), and Direction.	Amount (0-10), and Direction.	Velocity (0-4), and Direction.	Amount (0-10), and Direction.	Velocity (0-4), and Direction.	Amount (0-10), and Direction.	Velocity (0-4), and Direction.	Amount (0-10), and Direction.	Velocity (0-4), and Direction.	Amount (0-10), and Direction.	Velocity (0-4), and Direction.	Amount (0-10), and Direction.	Velocity (0-4), and Direction.	Amount (0-10), and Direction.	Velocity (0-4), and Direction.	Amount (0-10), and Direction.	Velocity (0-4), and Direction.	Amount (0-10), and Direction.	Velocity (0-4), and Direction.	Amount (0-10), and Direction.	Velocity (0-4), and Direction.	Amount (0-10), and Direction.	Velocity (0-4), and Direction.	Amount (0-10), and Direction.	Velocity (0-4), and Direction.	Amount (0-10), and Direction.	Velocity (0-4), and Direction.	Amount (0-10), and Direction.	Velocity (0-4), and Direction.	Amount (0-10), and Direction.	Velocity (0-4), and Direction.	Amount (0-10), and Direction.	Velocity (0-4), and Direction.	Amount (0-10), and Direction.	Velocity (0-4), and Direction.	Amount (0-10), and Direction.	Velocity (0-4), and Direction.	Amount (0-10), and Direction.	Velocity (0-4), and Direction.	Amount (0-10), and Direction.	Velocity (0-4), and Direction.	Amount (0-10), and Direction.	Velocity (0-4), and Direction.	Amount (0-10), and Direction.	Velocity (0-4), and Direction.	Amount (0-10), and Direction.	Velocity (0-4), and Direction.	Amount (0-10), and Direction.	Velocity (0-4), and Direction.	Amount (0-10), and Direction.	Velocity (0-4), and Direction.	Amount (0-10), and Direction.	Velocity (0-4), and Direction.	Amount (0-10), and Direction.	Velocity (0-4), and Direction.	Amount (0-10), and Direction.	Velocity (0-4), and Direction.	Amount (0-10), and Direction.	Velocity (0-4), and Direction.	Amount (0-10), and Direction.	Velocity (0-4), and Direction.	Amount (0-10), and Direction.	Velocity (0-4), and Direction.	Amount (0-10), and Direction.	Velocity (0-4), and Direction.	Amount (0-10), and Direction.	Velocity (0-4), and Direction.	Amount (0-10), and Direction.	Velocity (0-4), and Direction.	Amount (0-10), and Direction.	Velocity (0-4), and Direction.	Amount (0-10), and Direction.	Velocity (0-4), and Direction.	Amount (0-10), and Direction.	Velocity (0-4), and Direction.	Amount (0-10), and Direction.	Velocity (0-4), and Direction.	Amount (0-10), and Direction.	Velocity (0-4), and Direction.	Amount (0-10), and Direction.	Velocity (0-4), and Direction.	Amount (0-10), and Direction.	Velocity (0-4), and Direction.	Amount (0-10), and Direction.	Velocity (0-4), and Direction.	Amount (0-10), and Direction.	Velocity (0-4), and Direction.	Amount (0-10), and Direction.	Velocity (0-4), and Direction.	Amount (0-10), and Direction.	Velocity (0-4), and Direction.	Amount (0-10), and Direction.	Velocity (0-4), and Direction.	Amount (0-10), and Direction.	Velocity (0-4), and Direction.	Amount (0-10), and Direction.	Velocity (0-4), and Direction.	Amount (0-10), and Direction.	Velocity (0-4), and Direction.	Amount (0-10), and Direction.	Velocity (0-4), and Direction.	Amount (0-10), and Direction.	Velocity (0-4), and Direction.	Amount (0-10), and Direction.	Velocity (0-4), and Direction.	Amount (0-10), and Direction.	Velocity (0-4), and Direction.	Amount (0-10), and Direction.	Velocity (0-4), and Direction.	Amount (0-10), and Direction.	Velocity (0-4), and Direction.	Amount (0-10), and Direction.	Velocity (0-4), and Direction.	Amount (0-10), and Direction.	Velocity (0-4), and Direction.	Amount (0-10), and Direction.	Velocity (0-4), and Direction.	Amount (0-10), and Direction.	Velocity (0-4), and Direction.	Amount (0-10), and Direction.	Velocity (0-4), and Direction.	Amount (0-10), and Direction.	Velocity (0-4), and Direction.	Amount (0-10), and Direction.	Velocity (0-4), and Direction.	Amount (0-10), and Direction.	Velocity (0-4), and Direction.	Amount (0-10), and Direction.	Velocity (0-4), and Direction.	Amount (0-10), and Direction.	Velocity (0-4), and Direction.	Amount (0-10), and Direction.	Velocity (0-4), and Direction.	Amount (0-10), and Direction.	Velocity (0-4), and Direction.	Amount (0-10), and Direction.	Velocity (0-4), and Direction.	Amount (0-10), and Direction.	Velocity (0-4), and Direction.	Amount (0-10), and Direction.	Velocity (0-4), and Direction.	Amount (0-10), and Direction.	Velocity (0-4), and Direction.	Amount (0-10), and Direction.	Velocity (0-4), and Direction.	Amount (0-10), and Direction.	Velocity (0-4), and Direction.	Amount (0-10), and Direction.	Velocity (0-4), and Direction.	Amount (0-10), and Direction.	Velocity (0-4), and Direction.	Amount (0-10), and Direction.	Velocity (0-4), and Direction.	Amount (0-10), and Direction.	Velocity (0-4), and Direction.	Amount (0-10), and Direction.	Velocity (0-4), and Direction.	Amount (0-10), and Direction.	Velocity (0-4), and Direction.	Amount (0-10), and Direction.	Velocity (0-4), and Direction.	Amount (0-10), and Direction.	Velocity (0-4), and Direction.	Amount (0-10), and Direction.	Velocity (0-4), and Direction.	Amount (0-10), and Direction.	Velocity (0-4), and Direction.	Amount (0-10), and Direction.	Velocity (0-4), and Direction.	Amount (0-10), and Direction.	Velocity (0-4), and Direction.	Amount (0-10), and Direction.	Velocity (0-4), and Direction.	Amount (0-10), and Direction.	Velocity (0-4), and Direction.	Amount (0-10), and Direction.	Velocity (0-4), and Direction.	Amount (0-10), and Direction.	Velocity (0-4), and Direction.	Amount (0-10), and Direction.	Velocity (0-4), and Direction.	Amount (0-10), and Direction.	Velocity (0-4), and Direction.	Amount (0-10), and Direction.	Velocity (0-4), and Direction.	Amount (0-10), and Direction.	Velocity (0-4), and Direction.	Amount (0-10), and Direction.	Velocity (0-4), and Direction.	Amount (0-10), and Direction.	Velocity (0-4), and Direction.	Amount (0-10), and Direction.	Velocity (0-4), and Direction.	Amount (0-10), and Direction.	Velocity (0-4), and Direction.	Amount (0-10), and Direction.	Velocity (0-4), and Direction.	Amount (0-10), and Direction.	Velocity (0-4), and Direction.	Amount (0-10), and Direction.	Velocity (0-4), and Direction.	Amount (0-10), and Direction.	Velocity (0-4), and Direction.	Amount (0-10), and Direction.	Velocity (0-4), and Direction.	Amount (0-10), and Direction.	Velocity (0-4), and Direction.	Amount (0-10), and Direction.	Velocity (0-4), and Direction.	Amount (0-10), and Direction.	Velocity (0-4), and Direction.	Amount (0-10), and Direction.	Velocity (0-4), and Direction.	Amount (0-10), and Direction.	Velocity (0-4), and Direction.	Amount (0-10), and Direction.	Velocity (0-4), and Direction.	Amount (0-10), and Direction.	Velocity (0-4), and Direction.	Amount (0-10), and Direction.	Velocity (0-4), and Direction.	Amount (0-10), and Direction.	Velocity (0-4), and Direction.	Amount

BAROMETER, "corrected Mean" at 9 A.M., minus the Correction†† = 28.740
for Temp. (Col. 2), = 28.806... - 0.066...
"Corrected Mean" of Barometer at 9 P.M., minus the Correction†† = 28.763
for Temp. (Col. 4), = 28.826... - 0.063...
Mean at Station, corrected, and at 32°... = 28.752
Correction for height, feet above Mean Sea-level, = 1.202
Mean, reduced to 32°, and Sea-level, = 29.954
Highest Reading, corrected for Index error, on the 19th, = 29.154
Lowest Do. Do., on the 10th, = 28.372
Difference, or Monthly Range, = 0.782

S.-R. THERMOMETER, (in shade, etc.), Highest in Month, (corrected for Index Errors), on the 19th, = 75.2
Lowest in Month, corrected for Index errors, on the 1th, = 34.8
Difference, or Monthly Range, = 40.4
"Corrected Mean" of all the Highest, (Col. 5), = 61.2
"Corrected Mean" of all the Lowest, (Col. 6), = 45.1
Difference, or Mean Daily Range, = 16.1
"Calculated Mean Temperature of Month, = 53.9
S.-R. THERMOMETER, Black Bulb in Sun, Highest, (corrected for Index Errors), on the 23th, = 123.0
"Corrected Mean," (Col. 7), of Black Bulb, Max. in Sun, = 98.0
Lowest at Night, Black Bulb, (corrected for Index errors), on the 1th, = 31.3
"Corrected Mean," (Col. 8), of Black Bulb, Min. on grass, = 42.3
Difference of above Means or Range ("exposed"), =

HYGROMETER, Mean (corrected) A.M. and P.M. Reading of Dry Bulb, (Cols. 9 and 11), = 53.41
Mean (corrected) A.M. and P.M. Reading of Wet Bulb, (Cols. 10 and 12), = 57.2
†† Computed Temperature of Dew-Point, = 49.0
†† Do. Elastic Force of Vapour, = 347
†† Do. Weight of Vapour in a Cubic Foot of Air, = 85
†† Relative Humidity, (Saturation = 100), = 85
RAIN fell on 14 Days; Amount in Inches, = 3.64

WIND.	SUMMARY.									
	Direction.	N	NE	E	SE	S	SW	W	NW	Mean Force.
A.M.		3	7	4	2	2	7	4	2	0.37
P.M.		2	12	7	6	2	6	0	1	0.54
Mean.		2	10	3	4	2	6	2	2	0.46

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

Observations made and
Return verified by

James A. H. H.

(Signed)

James A. H. H.

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

One of the objects of immediate importance that the Scottish Meteorological Society has proposed to itself, is to secure a *perfect uniformity* in the system of observation pursued at all its Stations. A certain degree of uniformity is absolutely necessary to justify the publication of Monthly Results from different observations; and it is found that differences between the Returns from any two Stations, so very considerable as to render them quite incomparable, may arise from dissimilarity in the position or shelter of instruments, different hours of observation, or even from the use of differently constructed instruments. It is therefore hoped, that those persons who kindly furnish Reports to the Society will by a scrupulous attention to the following Directions, secure for their Monthly Returns, an accuracy and value commensurate with the labour and pains involved in making them; and for the Tables published by the Society, an entire comprehensiveness among the several Returns, without which the Society's Reports must inevitably fall 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 times punctually 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 *Anemoids*, 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, 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 the *index-line* on this little piston-rod is brought by the adjusting screw, to *fix one straight line* with those on its ivory frame, the scale is graduated. In taking an observation, this *preliminary setting* must be made with scrupulous accuracy; as a *slight error* here will vitiate the readings from the *vernier*.

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

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

In *taking an Observation*, the attached Thermometer is first noted: the tube must then be gently tapped and the cistern-adjustment carefully made. By raising and lowering the eye, it must be brought into the plane of the back and front of the index;—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 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 opticians, Self-registering Thermometers, Professor Phillips, and Negretti and Zambra's Patent "Meteorological" Thermometers are recommended: printed directions for their use may be obtained with each instrument. The "Minimum" Thermometer of Kutherford is recommended when graduated on the glass stem and affixed to a frame separate from the "Maximum." This Thermometer is liable to two damages, 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; if still 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 in contact with the body of the liquid. These instruments should be hung horizontally.

The above remarks apply equally to the Thermometers for registering the greatest heat from the sun's rays, and the least

from radiation during night. Their bulbs have a black coating which may easily be made or renewed 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 are not graduated on the stem, but merely on an attached scale, undergo repairs, they are very liable to be moved from their position on the Scale, and ought never afterwards to be used, without being *re-tested*. The self-registering, and especially the "Minimum" Thermometers, ought frequently to be compared with the dry bulb of the Hygrometer. The freezing-point of each Thermometer (marked by a scratch on the tube) ought to be tested once a year, in snow or melting ice. For comparison of Thermometers, a properly tested Thermometer may be had, on loan, by any observer, from the Meteorological Secretary.

The Hygrometer consists of two Thermometers usually, but not necessarily, mounted on one frame. As apparently slight deviations from the approved and *well-tested* form of this apparatus 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 cover 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 bulb;—the mesh 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 mesh is always *clean* and *whole*, 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 insulated 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 water-cup underneath. This arrangement must also support the water-cup underneath. This arrangement must be immediately altered by pulling the boxwood frame out of the case, and hanging them side by side, so that the recommended requirements shall be complied with, as far as possible.

Reading of the Thermometer.—Great care must be taken to avoid the effects of refraction, by bringing the eye exactly opposite the tip of the index or column of mercury. The reading ought to be taken to tenths of a degree, and noted in decimals. Thus the Thermometer will be read—39°·9, 40°·0, or 40°·1; or again, 40°·4, 40°·5, or 40°·6, according as it indicates a little under, an exact coincidence with, or a little over 40° or 40½, respectively. So also 40½, and 40¾, more or less must be registered 40°·2 or 40°·3, and 40°·7 or 40°·8 respectively. In reading Kutherford's "Min." and "Max." 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 occurrences to their proper registered *logical day*. In the Society's schedule, the indications registered on the *cell* are those of a series of phenomena commencing at 9 p.m. on the 24th, and extending till 9 p.m. on the 25th.

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 winds feebly, reference must be made to the direction of the lower strata of clouds overhead, and to the direction of fancies, etc.

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.

Frost-gauges.—Many causes conspire to produce anomalies in rain returns. They arise, partly from untrustworthy 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 return on the day on which the rain fell.

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

Clouds.—Convenient abbreviations for Luke Howard's

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

Observations of the clouds are made at 9 a.m. and at sunset, as illustrating the condition and currents of the upper and lower regions of the atmosphere. The entries in the schedule are to be made in the following manner:—In the column "Velocity and Direction," $\frac{2}{W}$, (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 $\frac{2}{cast}$, (eq.) 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 prog. or 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 pier 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 13th, 15th, and 20th 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 Schönbien's or Moffat's papers are used. The paper is affixed by a pin to a board in the thermometer box, and the indication 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 8½, as an ozone entry in the schedule, will indicate that the ozone paper is tinted as "3" on the scale, that the wind is from the N.W., and that its force on the scale 0—6 is "4"; i.e., that it is *blowing fresh*.

Electricity.—Too much importance cannot be attached to electric condition of the atmosphere in connection with terrestrial magnetism, and as a meteorological phenomenon. A proper Electrometer is necessary to every complete meteorological observatory.

Remarks.—The "Remarks" column is too narrow, but unavoidably so. Some of the most valuable observations that can be taken are those for which no rules can be given nor hours assigned. The use of contractions ought, therefore to be taken every advantage of, and a list of such as are recognised and in use at Greenwich, and Southampton, are given at the foot of the column. Besides special and extraordinary observations, great prominence ought to be given in this column to prevalent differences in temperature, colour, velocity, and direction between the lower and upper strata of clouds; the colour of the sky, etc. Remarks in characters, colour, velocity, and direction of the lower strata of clouds, and elevations of the barometer, thunder, remarkable depressions and elevations of the barometer, thunder, storms, and remarkable falls of snow, hail, or rain, the hour of storms as have been hinted at above. When lofty hills are in the vicinity of an Observatory, the height of clouds and of the snow line in winter ought to be recorded.

By the use of abbreviations, the state of the weather at 9 a.m. and 9 p.m. ought to be registered, either in two columns, otherwise unoccupied, or in two ruled off for the purposes, 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 side margin.

"Observations in connection with the periodic return of the seasons" possess not only great scientific value, but are of considerable interest to the Agriculturist. The Council would direct the special attention of Observers to the registration of such phenomena; that the published Summaries may fairly represent the whole of Scotland. Observation ought to be confined to individual trees and shrubs; to particular species of birds; and, in the case of crops, to specified sorts reared from year to year on a selected piece of ground or farm.

The Council recommend that *year 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 publishers.

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.

EDINBURGH, 10th November 1892.

(By Order) A. B.

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

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

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.

EDINBURGH.

General Post Office Buildings,

Secretary of the Meteorological Society of Scotland,

MIR ALEXANDER BUCHAN,

SCOTTISH METEOROLOGICAL SOCIETY.

Observations taken at Braemar, County of Marischal, in Lat. 57° 11' N., Long. 3° 24' W., Distance from Sea 60 miles.Height of Cistern of the Barometer above Mean Sea-level 1114 feet, above Ground 5 feet.During the MONTH of September 1872.

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.		9 A.M.		P.M.		9 h. A.M.								
		Barometer.	At- tached Ther- mometer.	Barometer.	At- tached Ther- mometer.	Max.	Min.	Max. in Sun-rays.	Min. on Grass.	Dry bulb.	Wet bulb.	Dry bulb.	Wet bulb.	Direction.	Force.	Direction.	Force.	Readings of the U. S. Cap. Anemometer. No. _____	No. of inches.	Amount (0-10), and Species.	Velocity (0-10), and Direction.	Amount (0-10), and Species.	No. _____	No. _____	No. _____							
		inches.	°	inches.	°	No.	No.	No.	No.	°	°	°	°					9 h. A.M.						3 inches.	12 inches.	22 inches.					Temperature at 1 fathoms, and Density.	9 A.M. 9 P.M.
	1	28.742		28.800		52.8	41.3	87.2	36.8	47.0	42.9	45.7	43.8	NE 0	NE 0											99	Thin but cold all day	1				
	2	28.800		28.700		46.2	30.2	60.3	29.9	45.0	42.9	46.8	46.0	NE 0.2	NE 1.			0.63								99	On Sun. Rain P.M.	2				
	3	28.664		28.580		59.2	38.8	77.0	42.3	50.1	46.4	54.8	54.0	S 0.2	E 0			0.25								99	Thin P.M.	3				
	4	28.514		28.564		66.0	44.8	106.7	52.0	56.8	56.2	54.0	55.7	NE 0.5	NE 1			0.03								99	Do Do	4				
	5	28.564		28.618		66.0	45.0	96.8	54.2	55.0	54.3	56.8	55.0	NE 0	SW 0.2			0.03								99	Showy P.M. Land P.M.	5				
	6	28.600		28.628		63.7	46.8	82.3	40.8	56.0	55.0	57.8	50.7	W 0	W 0			—								99	Thin & dull	6				
	7	28.600		28.650		58.3	52.0	72.0	50.0	54.2	53.0	52.8	51.0	E 0	E 0			—								99	Do Do	7				
	8	28.680		28.696		57.4	46.0	63.0	44.3	53.0	52.7	51.9	41.7	SW 0	SW 0.5			0.04								99	Thin P.M.	8				
	9	28.508		28.454		57.7	44.3	85.2	41.0	50.7	49.3	51.3	49.0	SW 0	SW 0.5			0.03								99	Do	9				
	10	28.482		28.500		57.8	40.1	97.8	45.0	55.2	50.2	50.3	49.9	SW 1	SW 0			0.15								99	Thin & fine P.M. Rain P.M.	10				
	11	28.474		28.520		62.0	48.3	74.0	38.2	54.8	53.3	54.8	53.1	SW 0.2	SW 0.2			0.22								99	Do	11				
	12	28.716		28.900		63.0	51.8	107.2	48.3	56.4	54.8	55.3	53.3	SW 1	SW 0.2			0.20								99	Thin & fine	12				
	13	28.886		28.872		62.3	53.0	76.2	51.8	55.3	55.0	54.0	57.3	SW 0	SW 0.5			0.32								99	Rain all day	13				
	14	28.970		28.874		57.8	47.2	95.2	42.3	52.0	47.8	49.0	45.8	W 0.5	W 1.			—								99	Thin & fine	14				
	15	28.762		28.800		57.0	47.0	90.2	44.5	57.3	48.8	51.8	50.0	SW 1.	SW 1.			—								99	Do but dull	15				
	16	28.650		28.466		60.7	48.8	105.4	48.0	51.8	48.8	53.8	50.7	SW 0.5	SW 1.			0.05								99	Thin	16				
	17	28.520		28.320		56.0	44.2	70.7	40.8	50.2	45.8	45.0	42.8	SW 0.2	SW 1.			0.03								99	Do A.S.D.	17				
	18	28.000		28.132		51.8	40.3	84.2	39.0	46.3	44.0	45.0	43.3	S. 1.	SW 0.5			0.25								99	Thin	18				
	19	28.528		28.512		48.9	39.8	76.0	34.2	45.3	43.5	59.8	57.2	W 0.5	W 0.5			0.07								99	Thin	19				
	20	28.668		28.556		47.3	36.3	89.0	32.0	40.0	37.8	58.2	58.8	W 0.5	W 0.5			0.10								99	Do Snow in hills	20				
	21	28.512		28.632		46.0	34.0	94.0	32.0	39.5	36.8	58.0	53.8	W 0.5	W 1.			0.50								99	Do Do	21				
	22	28.650		28.590		45.8	35.2	93.8	34.0	38.6	36.0	58.8	57.8	W 1.	W 0.5			0.50								99	Very showy all day. Sun in hills	22				
	23	28.466		28.400		44.8	32.8	95.7	32.0	35.4	35.0	58.8	57.5	NE 0	NE 0			0.10								99	Do Snow	23				
	24	28.378		28.376		45.4	35.0	79.7	31.0	39.2	37.8	59.5	58.0	NE 0.2	NE 0.5			0.72								99	Do Do	24				
	25	28.328		28.520		45.8	37.3	79.3	36.0	42.0	41.0	58.8	52.4	N 5.	N 4.			0.68								99	Water. Maroon. Thin & P.M.	25				
	26	28.612		28.624		49.1	36.7	90.2	31.0	45.0	42.0	57.0	36.0	W 1	W 0.2			0.03								99	Thin & Sunshine	26				
	27	28.328		27.950		49.3	35.2	60.0	30.2	42.0	41.7	59.0	39.1	W 0	W 1			0.76								99	Rain	27				
	28	27.870		28.088		47.8	38.0	87.0	34.0	45.0	45.0	58.8	42.8	SW 1	NE 0.5			0.30								99	Do	28				
	29	28.300		28.450		57.0	40.0	96.2	35.1	45.7	43.1	42.8	41.2	SW 0	SW 0.2			0.13								99	Thin	29				
	30	28.318		28.428		49.0	42.0	64.0	32.0	44.6	42.6	42.3	42.0	N 0.2	SW 0.2			0.38								99	Thin & dull	30				
	31																										99		31			
Sums.		15.930		16.180		12.82	6.87	15.8	4.28	20.4	18.0	52.0	50.1	16.2	17.7			5.86	230	227						270270	NOTATION USED IN GENERAL REMARKS. n. denotes aurora. m. denotes meteor. ci. cirrus. n. nimbus. ci-cu. cirro-cumulus. r. rain. cu. cumulus. h. r. heavy rain. cu-s. cirro-stratus. c. h. r. continued heavy rain. d. dew. s. stratus. f. fog. sc. scud. fr. frost. sl. sleet. h. fr. hoar-frost. sh. snow. h. haze. so. ha. solar halo. h. d. heavy dew. sq. squall. h. l. light clouds. t. thunder. h. sh. light showers. w. wind. lu. co. lunar corona. g. gale of wind. lu. lu. lunar halo.					
Means.		28.531		28.539		54.3	42.3	86.2	39.4	48.0	46.0	47.0	45.0	0.54	0.59				77	76						9090						
† Total Corrections for Instrumental Errors.		-009		-009						-0.1	-0.1	0.6	0.6							76												
‡ Corrections for Diurnal Range.																																
“Cor-rected Means.”		28.522		28.530						45.9	44.9																					
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	31

BAROMETER, “corrected Mean” at 9 A.M., minus the Correction†† = 28.472
for Temp. (Col. 2), = 28.522 - 0.050.

“Corrected Mean” of Barometer at 9 P.M., minus the Correction†† = 28.483
for Temp. (Col. 4), = 28.539 - 0.056.

Mean at Station, corrected, and at 32°, = 28.478
Correction for height, feet above Mean Sea-level, = 1.114

Mean, reduced to 32°, and Sea-level, = 29.592

Highest Reading, corrected for Index error, on the 14th, = 28.970

Lowest Do. Do. on the 28th, = 27.810

Difference, or Monthly Range, = 1.160

S.-R. THERMOMETER, (in shade, etc.), Highest in Month, (corrected for Index Errors), on the 4th, = 66.0

Lowest in Month, corrected for Index errors, on the 2th, = 30.2

Difference, or Monthly Range, = 35.8

“Corrected Mean” of all the Highest, (Col. 5), = 54.3

“Corrected Mean” of all the Lowest, (Col. 6), = 42.3

Difference, or Mean Daily Range, = 12.0

“Calculated Mean Temperature of Month, = 48.3

S.-R. THERMOMETER, Black Bulb in Sun, Highest, (corrected for Index Errors), on the 12th, = 107.2

“Corrected Mean,” (Col. 7), of Black Bulb, Max. in Sun, = 86.23

Lowest at Night, Black Bulb, (corrected for Index errors), on the 2th, = 29.9

“Corrected Mean,” (Col. 8), of Black Bulb, Min. on grass, = 39.4

Difference of above Means or Range (“exposed”), = 46.8

HYGROMETER, Mean (corrected) A.M. and P.M. Reading of Dry Bulb, (Cols. 9 and 11), = 47.65

Mean (corrected) A.M. and P.M. Reading of Wet Bulb, (Cols. 10 and 12), = 45.4

†† Computed Temperature of Dew-Point, = 43.81

†† Do. Elastic Force of Vapour, = 27.88

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

†† Relative Humidity, (Saturation = 100), = 86.81

RAIN fell on 2.5 Days; Amount in Inches, = 5.86

WIND.		SUMMARY.					
Direction.	N	NE	E	SE	S	SW	W
A.M.	2	4	1	0	2	12	4
P.M.	4	2	0	0	14	4	5
Mean.	1	4	2	0	1	13	4

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

Observations made and
Return verified by

(Signed)

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 elements 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. 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-marks* are not true inches but so much shorter as to compensate the error that would otherwise arise from the fluctuations of the surface of mercury in the cistern. This form of instrument has been adopted by the Board of Trade, and has received the approval of the Meteorological Committee of the British Association. In another form of the Barometer, the sides of the *cistern* are of leather, and thus, by aid of a screw acting on the bottom, the surface of the contained mercury can be adjusted to the *zero-point* of the fixed scale; their coincidence being indicated by a little ivory float, whose stem passes freely through the lid and case of the cistern. When the *index-line* on this little piston-rod is brought by the adjusting screw, to form one straight line with those on its ivory framing, the surface of the mercury is then at the exact height from which the scale is graduated. In taking an observation, this *preliminary* setting must be made with scrupulous accuracy; as a slight error here will vitiate the readings from the *vernier*.

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 *serve* up the mercury to within a quarter of an inch of the top of the tube, and take down the instrument; it may then be carried with the cistern uppermost. Before suspending the Barometer for use, it must be ascertained whether the space above the mercury in the tube is a complete vacuum; this is the case when, on inclining the instrument so that the mercury strikes the top of the tube, a *sharp tap* is produced. If this is prevented by air it may be removed to the cistern, and got rid of, by inverting the Barometer (care being taken to prevent the loss of mercury by agitating 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 *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 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 opticians, Messrs. Rogers and Sons, 15, Abchurch Lane, London, E.C. 4.

Self-registering Thermometers.—Professors Phillips, and Negretti and Zambra's Patent "Minimum" Thermometers are recommended: printed directions for their use may be obtained with each instrument. The "Minimum" Thermometer of Ruthven is recommended when graduated on the glass scale, and affixed to a frame separate from the "Maximum." This Thermometer is liable to two arrangements, 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 near the top of the tube, and must be disengaged from thence by heating that part over a lamp; the alcohol will evaporate and again condense in contact with the body of the liquid. These instruments should be hung horizontally.

The above remarks apply equally to the Thermometers for registering the greatest heat from the sun's rays, and the least

from radiation during night. Their bulbs have a black coating, which may easily be made or mended, by the application of a mixture of lamp black and printers' 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 are not graduated on the stem, but merely on an attached scale, undergo repairs, they are very liable to be moved from their position on the Scale, and ought never afterwards to be used, without being re-tested. The self-registering, and especially the "Minimum" Thermometers, ought frequently to be compared with the dry bulb of the Hygrometer. The freezing-point of each Thermometer (marked by a scratch on the tube) ought to be tested once a year, in snow or melting ice. For comparison of Thermometers, a properly tested Thermometer may be had, on loan, by any observer, from the Meteorological Society.

The Hygrometer consists of two Thermometers usually, but not necessarily, mounted on one frame. As apparently slight deviations from the approved and well-tested form of this apparatus specially vitiate the "Hygrometrical Deductions," Observers are 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 the water pure. In frosty weather observation is a matter of much delicacy, and must be made with great care. The bulb must be moistened by immersion from 15 to 30 minutes before the hour of observation. From the film of ice thus formed evaporation will proceed as from the moist cloth in ordinary circumstances.

One form of "Nelson'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 to 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, or 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 bulb, 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 A.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 schedules, 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 direction of the wind is feebly, reference must be made to the always when the wind is feebly, 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 unavoidable 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 column, under the following conditions:—When a Snow shower occurs it must be noted in the "Remarks," and the latter S added 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 windy, rainy, and snowy, as indeed in every column, the observer cannot be too careful to register observations only, and nothing that partakes of the nature of deduction or inference.

Clouds.—Convenient abbreviations for Luke Howard's nomenclature of clouds will be found on the other side. The amount of cloud in the atmosphere ought to be estimated from the greater or less obscuration of the sky overhead (i.e., within 20° or 30° of the zenith). The strata of clouds that appear near the horizon are viewed obliquely; and thus, being unable to judge of their amount, we ought not to take them into account in the *clouds* column, though their appearances and changes ought to be noted among the "Remarks." The amount of cloud is entered from a scale of 0 to 10; thus, when the sky overhead is half covered by clouds, 5 is entered as the observation, and so on. Observations of the clouds are made at 9 A.M. and at sunset, as illustrating the condition and currents of the upper and lower regions of the atmosphere. The entries in the schedule are to be made in the following manner:—In the column "Velocity 9, S. W., 2, W., 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 2, cu-st. (i.e.,) 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 consistency,—the Council recommend that observations in this interesting department be made at 9 A.M., by Hygrometers 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 general natural condition of the soil in which these Thermometers are placed.

Temperature of the Sea.—A knowledge of the temperature of the sea is not only in itself, but in its relations to that of our island, a very important branch of Meteorology. The Council, therefore recommend that the temperature of the sea be carefully taken by a properly constructed apparatus, from the ends of piers and rocks round the coast, where it is not influenced by that of river water. At or near the time of high water, on the 5th, 15th, and 25th of each month, the thermometer ought to be sunk exactly six feet (one fathom), and after ten minutes have elapsed, drawn up and read. When convenient, extra sea observations might be taken for other and greater depths, noting always the temperature of the air, and the hour of observation; and continuing to observe for particular depths.

Temperature of Wells.—The temperature of the water at the bottoms of wells ought, when practicable, to be taken, and the depth of the well and of the water noted.

Ozone.—Mention whether Solihoben's or Meiffert's papers are used. The paper is affixed by a pin to a board in the thermometer box, and the indication 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 8 x N, as an ozone entry in the schedule, will indicate that the ozone paper is tinted as "3" on the scale, that the wind is from the N.W., and that its force on the scale 0—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 Barometer 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 special 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 limited at above. When lofty hills are in the vicinity of an Observatory, the height of clouds and of the snow-line in winter ought to be recorded.

By the use of abbreviations, the state of the weather at 9 A.M. and 9 P.M. ought to be registered, either in two columns, otherwise unoccupied, or in two ruled off for the purposes, from that headed "Remarks." It is intended that observations by the Barometer should be entered in this manner or on the side-margin. Additional remarks may be made on the side-margin.

"Observations in connection with the periodic return of the seasons," possess not only great scientific value, but are of considerable interest to the Agriculturist. The Council would direct the special attention of Observers to the registration of such phenomena; that the published Summaries may fairly represent the whole of Scotland. Observation ought to be confined to individual trees and shrubs; to particular species of birds, and, in the case of crops, to specified sorts reared from year to year on a selected piece of ground or farm.

The Council recommend that *ten 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.
Dunfermline, 10th November 1892.

BOOK-POST.

EDINBURGH.

General Post Office Buildings,

Secretary of the Meteorological Society of Scotland.

MR ALEXANDER BUCHAN,

76

EMERALD
CLIPPER
1893

OBSERVATIONS IN CONNECTION WITH THE PERIODICAL RETURN OF THE SEASONS.

FOREST TREES.	In Flower.	Leaf Birds First appear.	In Leaf.	Divested of Leaves.	CROPS, mentioning variety.	Sowing or Ploughing.	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,		
Bountree or Elder,		Black Currant,			Curlew,		
Broom,		Cherry,			House-Swallow,		
Hazel,		Gean,			Lapwing,		
Hawthorn,		Gooseberry,			Plover,		
Holly,		Peach,			Sand-Martin,		
Laburnum,		Pear,			Starling,		
Lilac,		Plum,			Swan,		
Mezereon,		Strawberry,			Rail or Corn Crake,		
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.

SCOTTISH METEOROLOGICAL SOCIETY.

Observations taken at Perth, County of Abert, in Lat. 57° 14', Long. 3° 24', Distance from Sea 60 miles.Height of Cistern of the Barometer above Mean Sea-level 116 feet, above Ground 5 feet.During the MONTH of October 1872.

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 Disgages, 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.		9 h. A.M.		9 h. P.M.		Temperatures at 1 fathom, and Density.	9 A.M. 9 P.M.																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																	
		Barometer. * No.	Attach- ed Ther- mometer No.	Barometer. No.	Attach- ed Ther- mometer No.	Max. No.	Min. No.	Max. in Sun rays No.	Min. on Grass. No.	Dry bulb.	Wet bulb.	Dry bulb.	Wet bulb.	Direc- tion.	Force. in miles per hour.	Direc- tion.	Force.	Headline of the H.C. up Anemometer No.	No. of hours in which it fell.	Amount in inches. No.	9 A.M. Velocity (0-10), and Direction.			Amount (0-10), and Species.						9 P.M. Velocity (0-10), and Direction.	Amount (0-10), and Species.	9 h. A.M.																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																								
																																No.	inches.	No.	inches.	No.	inches.																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																			
		inches.	°	inches.	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°

BAROMETER, "corrected Mean" at 9 A.M., minus the Correction†† for Temp. (Col. 2), = 28.361
"Corrected Mean" of Barometer at 9 P.M., minus the Correction†† for Temp. (Col. 4), = 28.375
Mean at Station, corrected, and at 32°, = 28.368
Correction for height, feet above Mean Sea-level, = 1.202
Mean, reduced to 32°, and Sea-level, = 29.570
Highest Reading, corrected for Index error, on the 5th, = 29.100
Lowest Do. Do., on the 30th, = 27.922
Difference, or Monthly Range, = 1.178

S.-R. THERMOMETER, (in shade, etc.), Highest in Month, (corrected for Index Errors), on the 1th, = 56.0
Lowest in Month, corrected for Index errors, on the 5th, = 23.5
Difference, or Monthly Range, = 32.5
"Corrected Mean" of all the Highest, (Col. 5), = 48.9
"Corrected Mean" of all the Lowest, (Col. 6), = 36.9
Difference, or Mean Daily Range, = 12.0
* Calculated Mean Temperature of Month, = 42.9
S.-R. THERMOMETER, Black Bulb in Sun, Highest, (corrected for Index Errors), on the 2th, = 95.3
"Corrected Mean," (Col. 7), of Black Bulb, Max. in Sun, = 69.2
Lowest at Night, Black Bulb, (corrected for Index errors), on the 5th, = 20.6
"Corrected Mean," (Col. 8), of Black Bulb, Min. on grass, = 34.2
Difference of above Means or Range ("exposed"), = 35.0

HYGROMETER, Mean (corrected) A.M. and P.M. Reading of Dry Bulb, (Cols. 9 and 11), = 41.8
Mean (corrected) A.M. and P.M. Reading of Wet Bulb, (Cols. 10 and 12), = 40.3
† Computed Temperature of Dew-Point, = 38.4
† Do. Elastic Force of Vapour, = 4.234
† Do. Weight of Vapour in a Cubic Foot of Air, = 8.9
† Relative Humidity, (Saturation = 100), = 89
RAIN fell on 23 Days; Amount in Inches, = 4.83

WIND.	SUMMARY.									
	Direction.	N	NE	E	SE	S	SW	W	NW	Other or Variable.
A.M.	1	2	1	3	5	16	1	2	0	66
P.M.	0	3	3	5	2	14	3	7	0	79
Mean.	0	3	2	4	3	15	2	2	0	0.72 = 0.52

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

Observations made and
Return verified by

(Signed)

James G. G. G.

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 shaker of instruments, different hours of observation, or even from the use of differently constructed instruments. It is therefore hoped, that those persons who kindly furnish Reports to the Society will by a scrupulous attention to the following Directions, secure for their Monthly Returns, an accuracy and value commensurate with the labour and pains involved in making them; and for the Tables published by the Society, an entire comparableness among the several Returns, without which the Society's Reports must inevitably fail in achieving one of the main objects of Meteorological Observation.

Hour of Observation.—The Council recommend that Observations be made precisely at 9 o'clock (Greenwich or Railway Time 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 the exact time at which the observation was made, and to state the cause of the deviation. **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. Adie of London, the use of which is attended with the great convenience of requiring *no adjustment* of the cistern. Its *scale-marks* are not true inches but so much shorter as to *compensate* the error that would otherwise arise from the fluctuations of the surface of mercury in the cistern. This form of instrument has been adopted by the Board of Trade, and has received the approval of the Meteorological Committee of the British Association. In another form of the Barometer, the sides of the *cistern* are of leather, and thus by aid of a screw acting on the bottom, the surface of the contained mercury can be adjusted to the *zero-point* of the fixed scale; their coincidence being indicated by a little ivory float, whose stem passes freely through the lid and case of the cistern. When 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 *zenith*.

When a Barometer having adjustable surfaces has to be removed from its fastenings, the ivory peg must be screwed so as to form a tight plug to the cistern. Then *serve* up the mercury to within a quarter of an inch of the top of the tube and take down the instrument; it may then be carried with the cistern upmost. 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 lap* is produced. If this is prevented by air in the cistern, the ivory peg is removed, and the cistern is again filled with mercury (care being taken to prevent the loss of mercury by tilting 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 *shade*, 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 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 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 opticians, Negretti and Zambra Patent "Minimum" Thermometers, and recommended: printed directions for their use may be obtained with each instrument. The "Minimum" Thermometer of Batherford is recommended when graduated on the glass stem and affixed to a frame separate from the "Maximum." This Thermometer is liable to two damagements, 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; if 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 in contact with the body of the liquid. These instruments should be hung horizontally.

The above remarks apply equally to the Thermometers for registering the greatest heat from the sun's rays, and the least

from radiation during night. Their bulbs have a black coating, which may easily be made, or mended, by the application of a mixture of lamp black and printer's ink. They are placed in shallow blackened boxes, whose sides protect the bulbs from the wind. The "Maximum" should 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 are not furnished on the stem, but merely on an attached scale, undergo repairs, they are very liable to be moved from their position on the Scale, and ought never afterwards to be used, without being re-tested. The self-registering, and especially the "Minimum" Thermometers, ought frequently to be compared with the dry bulb of the Hygrometer. The freezing-point of each Thermometer (marked by a scratch on the tube) ought to be tested once a year, in snow or melting ice. For comparison of Thermometers, a properly tested Thermometer may be had, on loan, by any observer, from the Meteorological Secretary.

The Hygrometer consists of two Thermometers usually, but not necessarily, mounted on one frame. As apparently slight deviations from the approved and well-tested form of this apparatus seriously vitiate the "Hygrometric 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 supported; the water-cup must be covered, and placed to the side and a little below the level of the wet bulb;—in no case must the bulb;—the machine must be of medium fineness, and inspected 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 machine 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 side of ice thus formed evaporation.

The 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 of the Thermometer will be read—39° 9, 40° 9, 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 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 promptly 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 9 p.m. on the 24th, and extending till 9 p.m. on the 25th, are those of a series of phenomena commencing at above surrounding objects. When it oscillates incessantly, in mean direction must be taken; and when it is stationary, and always when the wind is feeble, reference must be made to the direction of the lower strata of clouds overhead, and to the direction of smoke, etc.

Careful observations ought to be made on the changes in the direction of the wind; and during storms, it is earnestly 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 observer 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 unfavorable situation for observation, and partly from the defective nature of the instruments used. It is, indeed, difficult to drain an imperfectly formed 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 level of the 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," and the letter S affixed to the depth of water received in gauges. 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 fall on the other side. The amount of cloud in the atmosphere ought to be estimated from the greater or less obscurely sky overhead (i.e., within 20° or 30° of the zenith). The sky of clouds that appear near the horizon are viewed obliquely; thus, being unable to judge of their amount, we ought to note them into account in the cloud column, though their paces and changes ought to be noted among the "Remarks" amount of cloud is entered from a scale of 0 to 10; th, in the sky overhead is half covered by clouds, 5 is extensive observation, and so on.

Observations of the cloud-atmosphere at 9 a.m. and at sunset, as illustrating the condition of the upper and lower regions of the atmosphere, figures in the schedule are to be made in the following manner:—In the column "Velocity 6, S. W." (for eaz) will indicate that the upper strata of clouds travel with a velocity from S. W., and those in the lower regions 1 W., with one-third the (extreme) speed of the former. 2, in the second "Cloud" column, an entry of 4, st. (eaz) indicate that the higher regions are covered to the "can" of 4-faths with *stratus* clouds; and that the sky is furnished to the extent of 2 clouds by lower clouds of the *stratus* kind.

Sunshine.—The number of hours which objects in the sun's rays cast shadows should be often the proper column. **Underground Thermometers.**—The general health of crops and plants greatly depend the temperature of the soil—its amount and consistency. Council recommend that observations in this interesting class be made at 9 a.m., by thermometers placed in the earth, bulbs being sunk to 3, 12, and 22 inches, and the surface ground protected from the sun's rays, and fitted with stop collars, to prevent rain-water being conveyed to the bulbous stems or wooden frames. Mention must be made of the general formation and agricultural condition of the soil in these Thermometers are placed.

Temperature of the Sea.—A knowledge of the temperature of the sea is not only in itself, but 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; the ice is not influenced by that of river water. At or near me of high water, on the 5th, 15th, and 25th of each month, the thermometer ought to be sunk exactly six feet (one fathom) after ten minutes have elapsed, down up and read. When convenient, extra sea observations might be taken for other water depths, noting always the temperature of the air, and the of observation; and continuing to observe for particular is.

Temperature of Wells.—The nature of the water at the bottoms of wells ought, when practicable, to be taken, and the depth of the well and of the water.

Ozone.—Mention whether Schall's or Mollat's papers are used. The paper is affixed by 1 to a board in the thermometer box, and the indication noted at 9 a.m. and 9 p.m. It is desired that these indications registered in connection with the force and direction of wind at the time of observation, in the following manner:—3%, as an ozone entry in the schedule will indicate that the paper is turned as "3" on the scale, that the wind is from N.W., and that its force on the scale 0-6 is "4"; i.e., this blowing fresh.

Electricity.—Too much notice cannot be attached to electric condition of the atmosphere in connection with terrestrial magnetism, and as a meteorological phenomenon. A proper Electrician is necessary to equip a complete meteorological observatory.

Remarks.—The "Remarks" column is too narrow, but unfortunately so. Some of the most valuable observations that can be taken are those for which no rules or given no hours assigned. The use of contractions ought, then, to be taken every advantage of, and a list of such as are raised and in use at Greenwich, and Southampton, are given the foot of the column. Besides special and extraordinary actions, great prominence ought to be given in this column to alien diseases, differences in character, colour, velocity, and place between the lower and upper strata of clouds, the cold sky, etc. Remarks ought to be made on the occurrence of aurora borealis, remarkable depressions and elevations of the barometer, thunder storms, and remarkable falls of snow, or rain, the hour of storms of wind attending their many, as well as such notes on storms as have been limited at 2. When lofty hills are in the vicinity of an Observatory, height of clouds and of the snow-line in winter ought to be noted.

By the use of abbreviations, these of the weather at 9 a.m. and 9 p.m. ought to be registered, in two columns, otherwise unoccupied, or in two ruled, for the purpose, from that headed "Remarks." It is intended that observations by the Electrician should be entered in manner on the side margin. Additional remarks may be made on the side margin. **Observations** in connection with periodic return of the seasons, possess not only great scientific value, but are of considerable attention to the Agricultural Society of Scotland, that the published Statistics may fairly represent the whole of Scotland. Observations ought to be confined to individual trees and shrubs; to pairs of species of birds; and, in the case of crops, to specimens separated from year to year on a selected piece of ground or soil.

The Council recommend that *large* observations be taken;—viz., on the 21st days of March, 9 September, and December.

Full directions for the use of instruments mentioned above have been printed, and may be had along with them from the printers.

The Council recommend that every person purchasing new instruments, should communicate with the Meteorological Secretary; and they consider it desirable that he should have full power to reject any instrument, on being presented for comparison, does not afford him fiction.

Dorchester, 10th November 1862.

(By Order) A. B.

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,		
Bountree or Elder,		Black Currant,			Curlew,		
Broom,		Cherry,			House-Swallow,		
Hazel,		Gean,			Lapwing,		
Hawthorn,		Gooseberry,			Plover,		
Holly,		Peach,			Sand-Martin,		
Laburnum,		Pear,			Starling,		
Lilac,		Plum,			Swan,		
Mezereon,		Strawberry,			Rail or Corn Crake,		
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.

EDINBURGH
General Post Office Buildings,
Secretary of the Meteorological Society of Scotland,
MR ALEXANDER BUCHAN,
60/1072
B. Cairns
APPROVED
NOV 13 1862
BRAEMA
12/2

SCOTTISH METEOROLOGICAL SOCIETY.

Observations taken at Perth, County of Angus, in Lat. 56° 45', Long. 3° 24', Distance from Sea 10 miles.
Height of Cistern of the Barometer above Mean Sea-level 114 feet, above Ground 5 feet.
During the MONTH of November 1872.
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 h. A.M.		9 h. P.M.		9 h. A.M.		9 h. P.M.																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																															
		Barometer. No.	Atmospheric Thermometer	Barometer. No.	Atmospheric Thermometer	Max. No.	Min. No.	Max. No.	Min. No.	Dry bulb.	Wet bulb.	Dry bulb.	Wet bulb.	Direction.	Force.	Direction.	Force.	No. of inches in fall.	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.	No. 12 inches.	No. 22 inches.					Temperature at 1 fathom, and Direction.	Temperature at 10 fathoms, and Direction.	Temperature at 20 fathoms, and Direction.	Temperature at 30 fathoms, and Direction.	Temperature at 40 fathoms, and Direction.	Temperature at 50 fathoms, and Direction.	Temperature at 60 fathoms, and Direction.	Temperature at 70 fathoms, and Direction.	Temperature at 80 fathoms, and Direction.	Temperature at 90 fathoms, and Direction.	Temperature at 100 fathoms, and Direction.	Temperature at 110 fathoms, and Direction.	Temperature at 120 fathoms, and Direction.	Temperature at 130 fathoms, and Direction.	Temperature at 140 fathoms, and Direction.	Temperature at 150 fathoms, and Direction.	Temperature at 160 fathoms, and Direction.	Temperature at 170 fathoms, and Direction.	Temperature at 180 fathoms, and Direction.	Temperature at 190 fathoms, and Direction.	Temperature at 200 fathoms, and Direction.	Temperature at 210 fathoms, and Direction.	Temperature at 220 fathoms, and Direction.	Temperature at 230 fathoms, and Direction.	Temperature at 240 fathoms, and Direction.	Temperature at 250 fathoms, and Direction.	Temperature at 260 fathoms, and Direction.	Temperature at 270 fathoms, and Direction.	Temperature at 280 fathoms, and Direction.	Temperature at 290 fathoms, and Direction.	Temperature at 300 fathoms, and Direction.	Temperature at 310 fathoms, and Direction.	Temperature at 320 fathoms, and Direction.	Temperature at 330 fathoms, and Direction.	Temperature at 340 fathoms, and Direction.	Temperature at 350 fathoms, and Direction.	Temperature at 360 fathoms, and Direction.	Temperature at 370 fathoms, and Direction.	Temperature at 380 fathoms, and Direction.	Temperature at 390 fathoms, and Direction.	Temperature at 400 fathoms, and Direction.	Temperature at 410 fathoms, and Direction.	Temperature at 420 fathoms, and Direction.	Temperature at 430 fathoms, and Direction.	Temperature at 440 fathoms, and Direction.	Temperature at 450 fathoms, and Direction.	Temperature at 460 fathoms, and Direction.	Temperature at 470 fathoms, and Direction.	Temperature at 480 fathoms, and Direction.	Temperature at 490 fathoms, and Direction.	Temperature at 500 fathoms, and Direction.	Temperature at 510 fathoms, and Direction.	Temperature at 520 fathoms, and Direction.	Temperature at 530 fathoms, and Direction.	Temperature at 540 fathoms, and Direction.	Temperature at 550 fathoms, and Direction.	Temperature at 560 fathoms, and Direction.	Temperature at 570 fathoms, and Direction.	Temperature at 580 fathoms, and Direction.	Temperature at 590 fathoms, and Direction.	Temperature at 600 fathoms, and Direction.	Temperature at 610 fathoms, and Direction.	Temperature at 620 fathoms, and Direction.	Temperature at 630 fathoms, and Direction.	Temperature at 640 fathoms, and Direction.	Temperature at 650 fathoms, and Direction.	Temperature at 660 fathoms, and Direction.	Temperature at 670 fathoms, and Direction.	Temperature at 680 fathoms, and Direction.	Temperature at 690 fathoms, and Direction.	Temperature at 700 fathoms, and Direction.	Temperature at 710 fathoms, and Direction.	Temperature at 720 fathoms, and Direction.	Temperature at 730 fathoms, and Direction.	Temperature at 740 fathoms, and Direction.	Temperature at 750 fathoms, and Direction.	Temperature at 760 fathoms, and Direction.	Temperature at 770 fathoms, and Direction.	Temperature at 780 fathoms, and Direction.	Temperature at 790 fathoms, and Direction.	Temperature at 800 fathoms, and Direction.	Temperature at 810 fathoms, and Direction.	Temperature at 820 fathoms, and Direction.	Temperature at 830 fathoms, and Direction.	Temperature at 840 fathoms, and Direction.	Temperature at 850 fathoms, and Direction.	Temperature at 860 fathoms, and Direction.	Temperature at 870 fathoms, and Direction.	Temperature at 880 fathoms, and Direction.	Temperature at 890 fathoms, and Direction.	Temperature at 900 fathoms, and Direction.	Temperature at 910 fathoms, and Direction.	Temperature at 920 fathoms, and Direction.	Temperature at 930 fathoms, and Direction.	Temperature at 940 fathoms, and Direction.	Temperature at 950 fathoms, and Direction.	Temperature at 960 fathoms, and Direction.	Temperature at 970 fathoms, and Direction.	Temperature at 980 fathoms, and Direction.	Temperature at 990 fathoms, and Direction.	Temperature at 1000 fathoms, and Direction.	Temperature at 1010 fathoms, and Direction.	Temperature at 1020 fathoms, and Direction.	Temperature at 1030 fathoms, and Direction.	Temperature at 1040 fathoms, and Direction.	Temperature at 1050 fathoms, and Direction.	Temperature at 1060 fathoms, and Direction.	Temperature at 1070 fathoms, and Direction.	Temperature at 1080 fathoms, and Direction.	Temperature at 1090 fathoms, and Direction.	Temperature at 1100 fathoms, and Direction.	Temperature at 1110 fathoms, and Direction.	Temperature at 1120 fathoms, and Direction.	Temperature at 1130 fathoms, and Direction.	Temperature at 1140 fathoms, and Direction.	Temperature at 1150 fathoms, and Direction.	Temperature at 1160 fathoms, and Direction.	Temperature at 1170 fathoms, and Direction.	Temperature at 1180 fathoms, and Direction.	Temperature at 1190 fathoms, and Direction.	Temperature at 1200 fathoms, and Direction.	Temperature at 1210 fathoms, and Direction.	Temperature at 1220 fathoms, and Direction.	Temperature at 1230 fathoms, and Direction.	Temperature at 1240 fathoms, and Direction.	Temperature at 1250 fathoms, and Direction.	Temperature at 1260 fathoms, and Direction.	Temperature at 1270 fathoms, and Direction.	Temperature at 1280 fathoms, and Direction.	Temperature at 1290 fathoms, and Direction.	Temperature at 1300 fathoms, and Direction.	Temperature at 1310 fathoms, and Direction.	Temperature at 1320 fathoms, and Direction.	Temperature at 1330 fathoms, and Direction.	Temperature at 1340 fathoms, and Direction.	Temperature at 1350 fathoms, and Direction.	Temperature at 1360 fathoms, and Direction.	Temperature at 1370 fathoms, and Direction.	Temperature at 1380 fathoms, and Direction.	Temperature at 1390 fathoms, and Direction.	Temperature at 1400 fathoms, and Direction.	Temperature at 1410 fathoms, and Direction.	Temperature at 1420 fathoms, and Direction.	Temperature at 1430 fathoms, and Direction.	Temperature at 1440 fathoms, and Direction.	Temperature at 1450 fathoms, and Direction.	Temperature at 1460 fathoms, and Direction.	Temperature at 1470 fathoms, and Direction.	Temperature at 1480 fathoms, and Direction.	Temperature at 1490 fathoms, and Direction.	Temperature at 1500 fathoms, and Direction.	Temperature at 1510 fathoms, and Direction.	Temperature at 1520 fathoms, and Direction.	Temperature at 1530 fathoms, and Direction.	Temperature at 1540 fathoms, and Direction.	Temperature at 1550 fathoms, and Direction.	Temperature at 1560 fathoms, and Direction.	Temperature at 1570 fathoms, and Direction.	Temperature at 1580 fathoms, and Direction.	Temperature at 1590 fathoms, and Direction.	Temperature at 1600 fathoms, and Direction.	Temperature at 1610 fathoms, and Direction.	Temperature at 1620 fathoms, and Direction.	Temperature at 1630 fathoms, and Direction.	Temperature at 1640 fathoms, and Direction.	Temperature at 1650 fathoms, and Direction.	Temperature at 1660 fathoms, and Direction.	Temperature at 1670 fathoms, and Direction.	Temperature at 1680 fathoms, and Direction.	Temperature at 1690 fathoms, and Direction.	Temperature at 1700 fathoms, and Direction.	Temperature at 1710 fathoms, and Direction.	Temperature at 1720 fathoms, and Direction.	Temperature at 1730 fathoms, and Direction.	Temperature at 1740 fathoms, and Direction.	Temperature at 1750 fathoms, and Direction.	Temperature at 1760 fathoms, and Direction.	Temperature at 1770 fathoms, and Direction.	Temperature at 1780 fathoms, and Direction.	Temperature at 1790 fathoms, and Direction.	Temperature at 1800 fathoms, and Direction.	Temperature at 1810 fathoms, and Direction.	Temperature at 1820 fathoms, and Direction.	Temperature at 1830 fathoms, and Direction.	Temperature at 1840 fathoms, and Direction.	Temperature at 1850 fathoms, and Direction.	Temperature at 1860 fathoms, and Direction.	Temperature at 1870 fathoms, and Direction.	Temperature at 1880 fathoms, and Direction.	Temperature at 1890 fathoms, and Direction.	Temperature at 1900 fathoms, and Direction.	Temperature at 1910 fathoms, and Direction.	Temperature at 1920 fathoms, and Direction.	Temperature at 1930 fathoms, and Direction.	Temperature at 1940 fathoms, and Direction.	Temperature at 1950 fathoms, and Direction.	Temperature at 1960 fathoms, and Direction.	Temperature at 1970 fathoms, and Direction.	Temperature at 1980 fathoms, and Direction.	Temperature at 1990 fathoms, and Direction.	Temperature at 2000 fathoms, and Direction.	Temperature at 2010 fathoms, and Direction.	Temperature at 2020 fathoms, and Direction.	Temperature at 2030 fathoms, and Direction.	Temperature at 2040 fathoms, and Direction.	Temperature at 2050 fathoms, and Direction.	Temperature at 2060 fathoms, and Direction.	Temperature at 2070 fathoms, and Direction.	Temperature at 2080 fathoms, and Direction.	Temperature at 2090 fathoms, and Direction.	Temperature at 2100 fathoms, and Direction.	Temperature at 2110 fathoms, and Direction.	Temperature at 2120 fathoms, and Direction.	Temperature at 2130 fathoms, and Direction.	Temperature at 2140 fathoms, and Direction.	Temperature at 2150 fathoms, and Direction.	Temperature at 2160 fathoms, and Direction.	Temperature at 2170 fathoms, and Direction.	Temperature at 2180 fathoms, and Direction.	Temperature at 2190 fathoms, and Direction.	Temperature at 2200 fathoms, and Direction.	Temperature at 2210 fathoms, and Direction.	Temperature at 2220 fathoms, and Direction.	Temperature at 2230 fathoms, and Direction.	Temperature at 2240 fathoms, and Direction.	Temperature at 2250 fathoms, and Direction.	Temperature at 2260 fathoms, and Direction.	Temperature at 2270 fathoms, and Direction.	Temperature at 2280 fathoms, and Direction.	Temperature at 2290 fathoms, and Direction.	Temperature at 2300 fathoms, and Direction.	Temperature at 2310 fathoms, and Direction.	Temperature at 2320 fathoms, and Direction.	Temperature at 2330 fathoms, and Direction.	Temperature at 2340 fathoms, and Direction.	Temperature at 2350 fathoms, and Direction.	Temperature at 2360 fathoms, and Direction.	Temperature at 2370 fathoms, and Direction.	Temperature at 2380 fathoms, and Direction.	Temperature at 2390 fathoms, and Direction.	Temperature at 2400 fathoms, and Direction.	Temperature at 2410 fathoms, and Direction.	Temperature at 2420 fathoms, and Direction.	Temperature at 2430 fathoms, and Direction.	Temperature at 2440 fathoms, and Direction.	Temperature at 2450 fathoms, and Direction.	Temperature at 2460 fathoms, and Direction.	Temperature at 2470 fathoms, and Direction.	Temperature at 2480 fathoms, and Direction.	Temperature at 2490 fathoms, and Direction.	Temperature at 2500 fathoms, and Direction.	Temperature at 2510 fathoms, and Direction.	Temperature at 2520 fathoms, and Direction.	Temperature at 2530 fathoms, and Direction.	Temperature at 2540 fathoms, and Direction.	Temperature at 2550 fathoms, and Direction.	Temperature at 2560 fathoms, and Direction.	Temperature at 2570 fathoms, and Direction.	Temperature at 2580 fathoms, and Direction.	Temperature at 2590 fathoms, and Direction.	Temperature at 2600 fathoms, and Direction.	Temperature at 2610 fathoms, and Direction.	Temperature at 2620 fathoms, and Direction.	Temperature at 2630 fathoms, and Direction.	Temperature at 2640 fathoms, and Direction.	Temperature at 2650 fathoms, and Direction.	Temperature at 2660 fathoms, and Direction.	Temperature at 2670 fathoms, and Direction.	Temperature at 2680 fathoms, and Direction.	Temperature at 2690 fathoms, and Direction.	Temperature at 2700 fathoms, and Direction.	Temperature at 2710 fathoms, and Direction.	Temperature at 2720 fathoms, and Direction.	Temperature at 2730 fathoms, and Direction.	Temperature at 2740 fathoms, and Direction.	Temperature at 2750 fathoms, and Direction.	Temperature at 2760 fathoms, and Direction.	Temperature at 2770 fathoms, and Direction.	Temperature at 2780 fathoms, and Direction.	Temperature at 2790 fathoms, and Direction.	Temperature at 2800 fathoms, and Direction.	Temperature at 2810 fathoms, and Direction.	Temperature at 2820 fathoms, and Direction.	Temperature at 2830 fathoms, and Direction.	Temperature at 2840 fathoms, and Direction.	Temperature at 2850 fathoms, and Direction.	Temperature at 2860 fathoms, and Direction.	Temperature at 2870 fathoms, and Direction.	Temperature at 2880 fathoms, and Direction.	Temperature at 2890 fathoms, and Direction.	Temperature at 2900 fathoms, and Direction.	Temperature at 2910 fathoms, and Direction.	Temperature at 2920 fathoms, and Direction.	Temperature at 2930 fathoms, and Direction.	Temperature at 2940 fathoms, and Direction.	Temperature at 2950 fathoms, and Direction.	Temperature at 2960 fathoms, and Direction.	Temperature at 2970 fathoms, and Direction.	Temperature at 2980 fathoms, and Direction.	Temperature at 2990 fathoms, and Direction.	Temperature at 3000 fathoms, and Direction.	Temperature at 3010 fathoms, and Direction.	Temperature at 3020 fathoms, and Direction.	Temperature at 3030 fathoms, and Direction.	Temperature at 3040 fathoms, and Direction.	Temperature at 3050 fathoms, and Direction.	Temperature at 3060 fathoms, and Direction.	Temperature at 3070 fathoms, and Direction.	Temperature at 3080 fathoms, and Direction.	Temperature at 3090 fathoms, and Direction.	Temperature at 3100 fathoms, and Direction.	Temperature at 3110 fathoms, and Direction.	Temperature at 3120 fathoms, and Direction.	Temperature at 3130 fathoms, and Direction.	Temperature at 3140 fathoms, and Direction.	Temperature at 3150 fathoms, and Direction.	Temperature at 3160 fathoms, and Direction.	Temperature at 3170 fathoms, and Direction.	Temperature at 3180 fathoms, and Direction.	Temperature at 3190 fathoms, and Direction.	Temperature at 3200 fathoms, and Direction.	Temperature at 3210 fathoms, and Direction.	Temperature at 3220 fathoms, and Direction.	Temperature at 3230 fathoms, and Direction.	Temperature at 3240 fathoms, and Direction.	Temperature at 3250 fathoms, and Direction.	Temperature at 3260 fathoms, and Direction.	Temperature at 3270 fathoms, and Direction.	Temperature at 3280 fathoms, and Direction.	Temperature at 3290 fathoms, and Direction.	Temperature at 3300 fathoms, and Direction.	Temperature at 3310 fathoms, and Direction.	Temperature at 3320 fathoms, and Direction.	Temperature at 3330 fathoms, and Direction.	Temperature at 3340 fathoms, and Direction.	Temperature at 3350 fathoms, and Direction.	Temperature at 3360 fathoms, and Direction.	Temperature at 3370 fathoms, and Direction.	Temperature at 3380 fathoms, and Direction.	Temperature at 3390 fathoms, and Direction.	Temperature at 3400 fathoms, and Direction.	Temperature at 3410 fathoms, and Direction.	Temperature at 3420 fathoms, and Direction.	Temperature at 3430 fathoms, and Direction.	Temperature at 3440 fathoms, and Direction.	Temperature at 3450 fathoms, and Direction.	Temperature at 3460 fathoms, and Direction.	Temperature at 3470 fathoms, and Direction.	Temperature at 3480 fathoms, and Direction.	Temperature at 3490 fathoms, and Direction.	Temperature at 3500 fathoms, and Direction.	Temperature at 3510 fathoms, and Direction.	Temperature at 3520 fathoms, and Direction.	Temperature at 3530 fathoms, and Direction.	Temperature at 3540 fathoms, and Direction.	Temperature at 3550 fathoms, and Direction.	Temperature at 3560 fathoms, and Direction.	Temperature at 3570 fathoms, and Direction.	Temperature at 3580 fathoms, and Direction.	Temperature at 3590 fathoms, and Direction.	Temperature at 3600 fathoms, and Direction.	Temperature at 3610 fathoms, and Direction.	Temperature at 3620 fathoms, and Direction.	Temperature at 3630 fathoms, and Direction.	Temperature at 3640 fathoms, and Direction.	Temperature at 3650 fathoms, and Direction.	Temperature at 3660 fathoms, and Direction.	Temperature at 3670 fathoms, and Direction.	Temperature at 3680 fathoms, and Direction.	Temperature at 3690 fathoms, and Direction.	Temperature at 3700 fathoms, and Direction.	Temperature at 3710 fathoms, and Direction.	Temperature at 3720 fathoms, and Direction.	Temperature at 3730 fathoms, and Direction.	Temperature at 3740 fathoms, and Direction.	Temperature at 3750 fathoms, and Direction.	Temperature at 3760 fathoms, and Direction.	Temperature at 3770 fathoms, and Direction.	Temperature at 3780 fathoms, and Direction.	Temperature at 3790 fathoms, and Direction.	Temperature at 3800 fathoms, and Direction.	Temperature at 3810 fathoms, and Direction.	Temperature at 3820 fathoms, and Direction.	Temperature at 3830 fathoms, and Direction.	Temperature at 3840 fathoms, and Direction.	Temperature at 3850 fathoms, and Direction.	Temperature at 3860 fathoms, and Direction.	Temperature at 3870 fathoms, and Direction.	Temperature at 3880 fathoms, and Direction.	Temperature at 3890 fathoms, and Direction.	Temperature at 3900 fathoms, and Direction.	Temperature at 3910 fathoms, and Direction.	Temperature at 3920 fathoms, and Direction.	Temperature at 3930 fathoms, and Direction.	Temperature at 3940 fathoms, and Direction.	Temperature at 3950 fathoms, and Direction.	Temperature at 3960 fathoms, and Direction.	Temperature at 3970 fathoms, and Direction.	Temperature at 3980 fathoms, and Direction.	Temperature at 3990 fathoms, and Direction.	Temperature at 4000 fathoms, and Direction.	Temperature at 4010 fathoms, and Direction.	Temperature at 4020 fathoms, and Direction.	Temperature at 4030 fathoms, and Direction.	Temperature at 4040 fathoms, and Direction.	Temperature at 4050 fathoms, and Direction.	Temperature at 4060 fathoms, and Direction.	Temperature at 4070 fathoms, and Direction.	Temperature at 4080 fathoms, and Direction.	Temperature at 4090 fathoms, and Direction.	Temperature at 4100 fathoms, and Direction.	Temperature at 4110 fathoms, and Direction.	Temperature at 4120 fathoms, and Direction.	Temperature at 4130 fathoms, and Direction.	Temperature at 4140 fathoms, and Direction.	Temperature at 4150 fathoms, and Direction.	Temperature at 4160 fathoms, and Direction.	Temperature at 4170 fathoms, and Direction.	Temperature at 4180 fathoms, and Direction.	Temperature at 4190 fathoms, and Direction.	Temperature at 4200 fathoms, and Direction.	Temperature at 4210 fathoms, and Direction.	Temperature at 4220 fathoms, and Direction.	Temperature at 4230 fathoms, and Direction.	Temperature at 4240 fathoms, and Direction.	Temperature at 4250 fathoms, and Direction.	Temperature at 4260 fathoms, and Direction.	Temperature at 4270 fathoms, and Direction.	Temperature at 4280 fathoms, and Direction.	Temperature at 4290 fathoms, and Direction.	Temperature at 4300 fathoms, and Direction.	Temperature at 4310 fathoms, and Direction.	Temperature at 4320 fathoms, and Direction.	Temperature at 4330 fathoms, and Direction.	Temperature at 4340 fathoms, and Direction.	Temperature at 4350 fathoms, and Direction.	Temperature at 4360 fathoms, and Direction.	Temperature at 4370 fathoms, and Direction.	Temperature at 4380 fathoms, and Direction.	Temperature at 4390 fathoms, and Direction.	Temperature at 4400 fathoms, and Direction.	Temperature at 4410 fathoms, and Direction.	Temperature at 4420 fathoms, and Direction.	Temperature at 4430 fathoms, and Direction.	Temperature at 4440 fathoms, and Direction.	Temperature at 4450 fathoms, and Direction.	Temperature at 4460 fathoms, and Direction.	Temperature at 4470 fathoms, and Direction.	Temperature at 4480 fathoms, and Direction.	Temperature at 4490 fathoms, and Direction.	Temperature at 4500 fathoms, and Direction.	Temperature at 4510 fathoms, and Direction.	Temperature at 4520 fathoms, and Direction.	Temperature at 4530 fathoms, and Direction.	Temperature at 4540 fathoms, and Direction.	Temperature at 4550 fathoms, and Direction.	Temperature at 4560 fathoms, and Direction.	Temperature at 4570 fathoms, and Direction.	Temperature at 4580 fathoms, and Direction.	Temperature at 4590 fathoms, and Direction.	Temperature at 4600 fathoms, and Direction.	Temperature at 4610 fathoms, and Direction.	Temperature at 4620 fathoms, and Direction.	Temperature at 4630 fathoms, and Direction.	Temperature at 4640 fathoms, and Direction.	Temperature at 4650 fathoms, and Direction.	Temperature at 4660 fathoms, and Direction.	Temperature at 4670 fathoms, and Direction.	Temperature at 4680 fathoms, and Direction.	Temperature at 4690 fathoms, and Direction.	Temperature at 4700 fathoms, and Direction.	Temperature at 4710 fathoms, and Direction.	Temperature at 4720 fathoms, and Direction.	Temperature at 4730 fathoms, and Direction.	Temperature at 4740 fathoms, and Direction.	Temperature at 4750 fathoms, and Direction.	Temperature at 4760 fathoms, and Direction.	Temperature at 4770 fathoms, and Direction.	Temperature at 4780 fathoms, and Direction.	Temperature at 4790 fathoms, and Direction.	Temperature at 4800 fathoms, and Direction.	Temperature at 4810 fathoms, and Direction.	Temperature at 4820 fathoms, and Direction.	Temperature at 4830 fathoms, and Direction.	Temperature at 4840 fathoms, and Direction.	Temperature at 4850 fathoms, and Direction.	Temperature at 4860 fathoms, and Direction.	Temperature at 4870 fathoms, and Direction.	Temperature at 4880 fathoms, and Direction.

NOTATION USED IN GENERAL REMARKS.

a. aurora.	m. denotes meteor.
cl. cirrus.	ms. meteors.
ci-cu. cirro-cumulus.	n. nimbus.
ci-s. cirro-stratus.	r. rain.
cu. cumulus.	h. r. heavy rain.
cu-s. cumulo-stratus.	c. h. r. continued heavy rain.
d. dew.	s. stratus.
f. fog.	sc. squall.
fr. frost.	sl. sleet.
h. fr. hoar-frost.	sn. snow.
h. haze.	so. ha. solar halo.
h. d. heavy dew.	sq. squall.
h. l. light.	sq. squall.
h. cl. light clouds.	th. thunder.
h. sh. light showers.	th. s. thunder storm.
h. co. lunar corona.	w. wind.
h. ha. lunar halo.	g. gale of wind.

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†† for Temp. (Col. 2), = 28.324
"Corrected Mean" of Barometer at 9 A.M., minus the Correction†† for Temp. (Col. 4), = 28.350
Mean at Station, corrected, and at 32°, = 28.337
Correction for height, feet above Mean Sea-level, = 1.202
Mean, reduced to 32°, and Sea-level, = 29.539
Highest Reading, corrected for Index error, on the 13 th, = 29.200
Lowest Do. Do., on the 23 th, = 27.490
Difference, or Monthly Range, = 1.710

S.-R. THERMOMETER, (in shade, etc.), Highest in Month, (corrected for Index Errors), on the 6 th, = 59.4
Lowest in Month, corrected for Index errors, on the 28 th, = 24.5
Difference, or Monthly Range, = 34.9
"Corrected Mean" of all the Highest, (Col. 5), = 42.9
"Corrected Mean" of all the Lowest, (Col. 6), = 33.9
Difference, or Mean Daily Range, = 9.0
* Calculated Mean Temperature of Month, = 38.4

S.-R. THERMOMETER, Black Bulb in Sun, Highest, (corrected for Index Errors), on the 3 th, = 67.3
"Corrected Mean," (Col. 7), of Black Bulb, Max. in Sun, = 49.4
Lowest at Night, Black Bulb, (corrected for Index errors), on the 28 th, = 18.3
"Corrected Mean," (Col. 8), of Black Bulb, Min. on grass, = 31.2
Difference of above Means or Range ("exposed"), = 18.2

HYGROMETER, Mean (corrected) A.M. and P.M. Reading of Dry Bulb, (Cols. 9 and 11), = 38.0

Mean (corrected) A.M. and P.M. Reading of Wet Bulb, (Cols. 10 and 12), = 36.9

†† Computed Temperature of Dew-Point, = 35.4

†† Do. Elastic Force of Vapour, = 2.06

†† Do. Weight of Vapour in a Cubic Foot of Air, = 9.0

†† Relative Humidity, (Saturation = 100), = 90

RAIN fell on 23 Days; Amount in Inches, = 7.26

WIND.		SUMMARY.				
Direction.	N	NE	E	SE	S	SW
A.M.	3	3	4	0	4	14
P.M.	1	5	2	4	0	17
Mean.	2	4	3	2	2	16

N.B.—The Suns to be correctly added and the Means deduced. 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 Gunned or Fastened, and Forwarded by Book Post, prepaid.

Observations made and
Return verified by

(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 incommensurable, may arise from dissimilarity in the position or shelter of instruments, different hours of observation, or even from the use of differently constructed instruments. It is therefore hoped, that those persons who kindly furnish Reports to the Society will by a scrupulous attention to the following Directions, secure for their Monthly Returns, an accuracy and value commensurate with the labour and pains involved in making them; and, for the Tables published by the Society, an entire comparableness among the several Returns, without which the Society's Reports must inevitably fail in achieving one of the main objects of Meteorological Observation.

Hours 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 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-marks are not true inches but so much shorter as to compensate the error that would otherwise arise from the fluctuations of the surface of mercury in the cistern. This form of instrument has been adopted by the Board of Trade, and has received the approval of the Meteorological Committee of the British Association. In another form of the Barometer, the sides of the cistern are of leather, and thus, by aid of a screw acting on the bottom, the surface of the contained mercury can be adjusted to the zero-point of the fixed scale; their coincidence being indicated by a little ivory float, whose stem passes freely through the lid and case of the cistern. When 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 remainder.

When a Barometer having adjustable surfaces has to be removed from its fastenings, the ivory peg must be screwed so as to form a tight plug to the cistern. Then screw 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 upmost. 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 lap is produced. If this is prevented by air it may be removed to the cistern, and got in by inverting the Barometer (care being taken to prevent the loss of mercury by deglazing 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-sight 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 nearly local influences. The laths forming the sides and floors of the Boxes are arranged so as 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 opticians, Self-registering Thermometers.—Professor Phillips, 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 when graduated on the glass stem, and affixed to a frame separate from the "Maximum". This Thermometer is liable to two disadvantages, 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, dislaid 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 in contact with the body of the liquid. These instruments should be hung horizontally. The above remarks apply equally to the Thermometers for registering the greatest heat from the sun's rays, and the least

from radiation during night. Their bulbs have a black coating, which may easily be made, or mended, by the application of a mixture of lamp black and printer's ink. They are placed in shallow blackened boxes, whose sides protect the bulbs from the wind. The "Maximum" should rest on wooden supports a few inches from the surface of the grass, in an open situation. Snow must not be allowed to cover either of these Thermometers; nor the sun's heat to affect the Minimum Thermometer by 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, undergo repairs, they are very liable to be moved from their position on the Scale, and ought never afterwards to be used, without being re-tested. The self-registering, and especially the "Minimum" Thermometers, ought frequently to be compared with the dry bulb of the Hygrometer. The freezing-point of each Thermometer (marked by a scratch on the tube) ought to be tested once a year, in snow or melting ice, 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 bulb;—the mastin 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 mastin is always clean and moist, and the water pure. In frosty weather observation is a matter of much delicacy, and must be made with great care. The bulb must be moistened by immersion from 15 to 30 minutes before the hour of observation. From the film of ice thus formed evaporation will proceed as from the moist cloth in ordinary circumstances. One form of "Mason's" Hygrometer is highly objectionable, 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 aforementioned requirements shall be complied with, as far as possible.

Reading of the Thermometer.—Great care must be taken to avoid the effects of refraction by bringing the eye exactly opposite the tip of the index or column of mercury. The reading ought to be taken to tenths of a degree, and noted in decimals. Thus the Thermometer will be read—39°·9, 40°·0, or 40°·1; or again, 40°·4, 40°·5, or 40°·6, according as it indicates a little under, an exact coincidence with, or a little over 40°, or 40½, respectively. So also 40½, and 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.

Hours 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 earnestly 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 unfavorable situation for observation, and partly from the defective nature of the instrument 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 it rains.

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

Clouds.—Convenient abbreviations for Luke Howard's

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

Observations of the clouds are made at 9 A.M. and at sunset, as illustrating the condition and currents of the upper and lower regions of the atmosphere. The entries in the schedule are to be made in the following manner:—In the column "Velocity 9, S. 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 2, (e.g.) will indicate that the higher regions are covered to the "amount" of 4-tenths with 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. Under special Thermometers.—As the position and length of crops and plants greatly depend on the temperature of the soil—its amount and consistency—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 iron collars, to prevent rain-water being conveyed to the bulbs by the stems or wooden frames. Mention must be made of the geological formation and agricultural condition of the soil in which these Thermometers are placed.

Temperature of the Sea.—A knowledge of the temperature of the sea is not only in itself, but in its relations to that of our island, a very important branch of Meteorology. The Council, therefore recommend that the temperature of the sea be carefully taken by a properly constructed apparatus, from the ends of piers and rocks round the coast, where it is not influenced by that of river water. At or near the time of high water, on the 5th, 15th, and 25th of each month, the thermometer ought to be sunk exactly six feet (one fathom), and after ten minutes have elapsed, drawn up and read. When convenient, extra sea observations might be taken for other and greater depths, noting always the temperature of the air, and the hour of observation; and continuing to observe for particular depths.

Temperature of Wells.—The temperature of the water at the bottoms of wells ought, when practicable, to be taken, and the depth of the well and of the water noted.

Ozone.—Mention whether Schloibert's or Moffat's papers are used. The paper is affected by a pin to a board in the thermometer box, and the indication 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 8½, as an ozone entry in the schedule, will indicate that the ozone paper is tinted as "4.3" on the scale, that the wind is from the N. W., and that its force on the scale 0-6 is "4.3"; i.e., that it is blown fresh.

Electricity.—Too much importance cannot be attached to electric condition of the atmosphere in connection with terrestrial vegetation, and as a meteorological phenomenon. A proper Electricometer is necessary to every complete meteorological observatory.

Remarks.—The "Remarks" column is too narrow, but unfortunately 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 limited at above. When lofty hills are in the vicinity of an Observatory, the height of clouds and of the snow-line in winter ought to be recorded.

By the use of abbreviations, the state of the weather at 9 A.M. and 9 P.M. ought to be registered, either in two columns, otherwise unoccupied, or in two ruled off for the purpose, from that headed "Remarks." It is intended that observations by the Electricometer 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. Observation ought to be confined to individual trees and shrubs; no particular species of birches, and in the case of crops, to special 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.

BOOK-POST.

General Post Office Buildings,
Secretary of the Meteorological Society of Scotland,

MR ALEXANDER BUCHAN,

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.

SCOTTISH METEOROLOGICAL SOCIETY.

Observations taken at Barnum, County of Abdeen, in Lat. 57° N., Long. 24° E. Distance from Sea 60 miles.
Height of Cistern of the Barometer above Mean Sea-level 114 feet, above Ground 5 feet. During the MONTH of December 1872.
The Hours of Observation are of Greenwich Time.

ELECTRICITY.	Days of Month.	BAROMETER.				SELF-REGISTERING THERMOMETERS. Read Daily at 9 A.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, & exposed 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. * No.	Attached Thermometer.	Barometer. No.	Attached Thermometer.	Max. No.	Min. No.	Max. in Sun's rays No.	Min. on Grass. No.	Dry bulb.	Wet bulb.	Dry bulb.	Wet bulb.	Direction.	Force.	Direction.	Force.		Readings of the H. Cup Anemometer. No. —	9 h. A.M.	No. of hours in which it fell.	Amount in inches. No. —	Velocity (0—10), and Direction.	Amount (0—10), and Species.	Velocity (0—10), and Direction.					Amount (0—10), and Species.	No. 1. 3 inches.	No. 12 inches.	No. 22 inches.
		inches.		inches.																													
	1	27.800		28.150		43.7	34.5	56.0	31.0	41.8	41.2	35.0	35.0	E	0	E	0				10	10	8							99	Showing a dull	1	
	2	28.150		28.350		40.0	22.5	50.3	21.0	27.8	27.8	37.1	36.3	N	0	N	1.5				1.11	1.11	3							99	Fog & Rain	2	
	3	28.556		28.652		36.7	23.2	45.0	22.7	35.1	36.5	32.0	31.5	N	0	N	0.2				—	—	3							99	Do	3	
	4	28.700		28.700		32.0	18.0	40.6	18.0	27.3	26.9	37.7	37.7	N	0	N	0				0.05	0.05	—							99	Clear & frosty	4	
	5	28.450		27.950		35.5	10.0	52.3	8.3	10.5	10.4	34.0	33.5	N	0	N	0.5				0.36	0.36	12							99	Do	5	
	6	27.664		27.800		41.8	34.2	48.2	28.2	39.0	39.0	39.8	40.0	S	1	SW	1.5				0.33	0.33	12							99	Do	6	
	7	27.804		27.822		41.6	36.0	40.5	26.0	38.6	38.0	37.1	36.0	SW	1	SW	1				0.02	0.02	12							99	Thin & sunny	7	
	8	27.850		27.700		39.2	27.1	45.0	30.8	36.8	34.3	27.1	26.8	SW	1	SW	1				—	—	12							99	Do	8	
	9	27.650		27.776		38.0	24.7	41.0	19.0	35.8	24.5	26.5	26.3	N	0	N	0.2				—	—	12							99	Do	9	
	10	27.884		28.050		35.3	20.0	39.8	20.4	27.8	27.8	32.0	31.0	N	0	N	0.5				—	—	12							99	Slight shower	10	
	11	28.360		28.576		33.2	26.8	42.2	24.6	33.2	33.2	27.0	27.0	N	1	N	1				0.02	0.02	12							99	Do	11	
	12	28.614		28.500		30.8	21.7	40.3	13.7	25.8	25.0	25.0	27.3	SW	0.2	N	0.5				—	—	12							99	Clear & frosty	12	
	13	28.850		28.300		32.0	23.7	42.7	14.3	24.1	23.7	24.3	24.0	N	0.2	N	0				—	—	12							99	Do	13	
	14	28.412		28.600		36.2	17.0	48.8	15.2	17.0	17.0	18.5	18.5	N	0	N	0				—	—	12							99	Do	14	
	15	28.680		28.622		30.7	18.0	30.0	14.2	21.2	21.2	30.0	30.0	SW	1	SW	0				0.04	0.04	12							99	Dull & foggy	15	
	16	28.588		28.512		37.3	29.0	41.8	22.2	35.8	35.5	35.0	35.0	N	0.2	E	1				—	—	12							99	Shower	16	
	17	28.392		28.520		36.2	31.0	52.0	31.0	31.8	31.8	32.3	32.0	E	1	E	0.5				0.85	0.85	12							99	Sunny all day	17	
	18	28.600		28.568		37.0	31.4	57.0	31.0	32.2	32.2	36.3	36.3	N	0	N	0.5				0.52	0.52	12							99	Do	18	
	19	28.532		28.568		37.8	31.0	57.2	32.0	37.0	36.2	36.0	36.6	SE	1	SE	1				0.45	0.45	12							99	Rain & sleet	19	
	20	28.550		28.500		38.2	33.8	59.0	32.0	36.8	36.2	34.5	34.5	SE	1.5	SE	1				0.52	0.52	12							99	Shower	20	
	21	28.502		28.662		36.0	33.5	55.2	32.7	35.0	35.0	35.3	35.0	N	0.5	N	0.5				0.44	0.44	12							99	Do	21	
	22	28.700		28.400		36.0	34.5	56.0	32.2	35.0	35.0	36.0	36.0	E	0	N	0.5				0.38	0.38	12							99	Very damp & stormy	22	
	23	28.018		28.040		46.2	33.8	46.2	33.2	45.2	44.0	43.9	41.8	SW	5	SW	1.5				0.24	0.24	12							99	Do	23	
	24	27.976		27.724		45.6	31.1	45.8	28.2	42.2	41.4	44.0	42.2	S	1	SE	1				0.94	0.94	12							99	Do	24	
	25	27.572		27.550		40.3	36.7	46.8	32.3	40.5	39.3	40.0	39.1	SW	0	N	2				0.28	0.28	12							99	Shower	25	
	26	28.050		28.174		43.3	36.2	53.8	30.0	35.0	34.7	43.0	40.5	N	0.5	N	0.5				0.21	0.21	12							99	Thin & sunny	26	
	27	28.150		28.200		49.9	40.8	49.9	36.7	47.0	46.2	47.4	46.3	S	1.5	N	2				1.83	1.83	12							99	Very showery & stormy	27	
	28	28.204		28.436		45.8	36.7	47.0	33.2	46.0	44.0	47.4	36.3	N	1.5	N	1.5				—	—	12							99	Thin & sunny	28	
	29	28.580		28.660		49.0	25.0	59.0	20.0	35.8	34.0	25.6	25.4	N	0	N	0.5				—	—	12							99	Do	29	
	30	28.580		28.432		45.2	20.3	52.0	15.0	30.8	29.0	36.0	35.0	E	1	E	1				0.23	0.23	12							99	Do	30	
	31	28.162		28.160		42.1	35.0	42.2	24.0	37.4	36.2	40.2	39.0	SE	1.5	S	1				0.22	0.22	12							99	Shower & thunder	31	
	Sums.	1513.5		1510.5		3715.0	1210.0	4714.0	117.0	3715.0	1210.0	3715.0	1210.0	17.2	22.9						47	47	230							2792.79			
	Means.	28.250		28.279		39.1	28.6	44.8	24.7	33.6	33.0	34.2	33.0	0.57	0.74						7.19	7.19	7.4							90.90			
	† Total Corrections for Instrumental Errors.	-0.09		-0.09																													
	† Corrections for Diurnal Range.																																
	"Corrected Means."	28.241		28.270																													
	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†† = 28.230
for Temp. (Col. 2), = 28.241..... - 0.11.....
"Corrected Mean" of Barometer at 9 P.M., minus the Correction†† = 28.253
for Temp. (Col. 4), = 28.270..... - 0.15.....
Mean at Station, corrected, and at 32°..... = 28.242
Correction for height, feet above Mean Sea-level..... = 1.202
Mean, reduced to 32°, and Sea-level..... = 29.444
Highest Reading, corrected for Index error, on the 4 th..... = 28.700
Lowest Do. Do., on the 15 th..... = 27.560
Difference, or Monthly Range..... = 1.140

S.-R. THERMOMETER, (in shade, etc.), Highest in Month, (corrected for Index Errors), on the 27 th..... = 49.9
Lowest in Month, corrected for Index errors, on the 4 th..... = 10.0
Difference, or Monthly Range..... = 39.9
"Corrected Mean" of all the Highest, (Col. 5),..... = 39.1
"Corrected Mean" of all the Lowest, (Col. 6),..... = 28.6
Difference, or Mean Daily Range..... = 10.5
** Calculated Mean Temperature of Month..... = 33.8
S.-R. THERMOMETER, Black Bulb in Sun, Highest, (corrected for Index Errors), on the 8 th..... = 65.0
"Corrected Mean," (Col. 7), of Black Bulb, Max. in Sun..... = 46.8
Lowest at Night, Black Bulb, (corrected for Index errors), on the 4 th..... = 5.0
"Corrected Mean," (Col. 8), of Black Bulb, Min. on grass..... = 24.87
Difference of above Means or Range ("exposed")..... = 22.0

HYGROMETER, Mean (corrected) A.M. and P.M. Reading of Dry Bulb, (Cols. 9 and 11),..... = 32.4 X 33.9
Mean (corrected) A.M. and P.M. Reading of Wet Bulb, (Cols. 10 and 12),..... = 32.9 X 32.9
†† Computed Temperature of Dew-Point..... = 32.3 31.1
†† Do. Elastic Force of Vapour..... = 1.84 1.5
†† Do. Weight of Vapour in a Cubic Foot of Air, ... =
†† Relative Humidity, (Saturation = 100),..... = 89
RAIN fell on 21 Days; Amount in Inches..... = 7.19

WIND.		SUMMARY.									
Direction.		N	NE	E	SE	S	SW	W	NW	Mean Force.	Mean Velocity in miles per day.
A.M.		1	4	3	3	4	12	2	2	0.57	
P.M.		3	3	3	4	2	10	1	5	0.74	
Mean.		2	4	3	3	3	11	4		0.66 = 0.44 x 1.5	

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

Observations made and
Return verified by

(Signed)

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 incomparably, may arise from dissimilarity in the position or shelter of instruments, different hours of observation, or even from the use of differently constructed instruments. It is therefore hoped, that those persons who kindly furnish Reports to the Society will by a scrupulous attention to the following Directions, secure for their Monthly Returns, an accuracy and value commensurate with the labour and pains involved in making them; and, for the Tables published by the Society, an entire comparableness among the several Returns, without which the Society's Reports must inevitably fail in achieving one of the main objects of Meteorological Observation.

Hour of Observation.—The Council recommend that Observations be made precisely at 9 o'clock (Greenwich or Railway Time 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. Aitke of London, the use of which is attended with the great convenience of requiring *no adjustment* of the cistern. Its *scale-marks* are not true inches but so much shorter as to *compensate* the error that would otherwise arise from the fluctuations of the surface of mercury in the cistern. This form of instrument has been adopted by the Board of Trade, and has received the approval of the Meteorological Committee of the British Association. In another form of the Barometer, the sides of the *cistern* are of leather, and thus, by aid of a screw acting on the bottom, the surface of the contained mercury can be adjusted to the *zero-point* of the fixed scale; their coincidence being indicated by a little ivory float, whose stem passes freely through the lid and case of the cistern. When 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 *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 to the cistern. Then *screw 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 upmost. 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 dip* 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 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 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 opticians, *Self-Registering Thermometers*.—Professor Phillips's, and Negretti and Zambra's Patent "*Marine*" Thermometers are recommended; painted directions for their use may be obtained with each instrument. The "*Minimum*" Thermometer of Rutherford is recommended when graduated on the glass stem and affixed to a frame separate from the "*Maximum*." This Thermometer is liable to two derangements, both of which must be guarded against, and may be easily remedied by striking the instrument repeatedly against the palm of the hand, which part of the spirit distils by light temperature, it will be found near the top of the tube and must be discoloured from thence by heating that part over a lamp; the alcohol will evaporate and again condense in contact with the body of the liquid. These instruments should be hung horizontally. The above remarks apply equally to the Thermometers for registering the greatest heat from the sun's rays, and the least

from radiation during night. Their bulbs have a black coating, which may easily be made, or mended, by the application of a mixture of lamp black and printer's ink. They are placed in shallow blackened boxes whose sides protect the bulbs from the wind. The "*Maximum*" should 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.

Registration 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 no 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-cap 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 mastin 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 mastin 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 insulated 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. The form of the Thermometer is highly objectionable. The frame of the Thermometer is enclosed in a tin case, which also supports the water cap 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 front-mounted requirements shall be completed 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 tubes, or *column* of mercury. The readings 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 40.4°, and 40½°, 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 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 schedules, the indications registered on the 8d. are those of a series of phenomena commencing at 9 P.M. on the 8d. 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 settles 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 earnestly recommended that extra observations be made at every hour, of Greenway 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 observer be furnished with a *Thermospherical-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 exact 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.

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

Clouds.—Convenient abbreviations for Luke Howard's

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

Observations of the clouds are made at 9 A.M. and at sunset, as illustrating the condition and currents of the upper and lower regions of the atmosphere. The entries in the schedule are to be made in the following manner:—In the column "*Velocity* and Direction," 6 S. 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 (average) speed of the former. Again, in the second "*Cloud*" column, an entry of 2, c. s. t., (c. s. t.) 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 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 depths of the well and of the water noted. **Crops.**—Mention whether Schimper's or Moffat's papers are used. The paper is affixed by a pin to a board in the thermometer box, and the indication 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:—this 3° is an ozone entry in the schedule, will indicate that the ozone paper is turned as 3° 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.

Remarks.—The "*Remarks*" column is too narrow, but unavoidably so. Some of the most valuable observations that can be taken are those for which no rules can be given nor hours assigned. The use of contractions ought, therefore, to be taken every advantage of, and a list of such as are recognised and in use at Greenwich and Southampton, are given at the foot of the column. Besides special and extraordinary observations, great prominence ought to be given in this column to prevalent diseases, differences in character, colour, velocity, and direction between the lower and upper strata of clouds, the colour of the sky, &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 unoccupied, or in two ruled on for the purpose, from that headed "*Remarks*." It is intimated that observations by the Electrometer should be entered in this manner or on the side-margin. Additional remarks may be made on the margin.

Observations in connection with the periodic return of the seasons, possess not only great scientific value, but are of considerable interest to the Agriculturist. The Council would direct the special attention of Observers to the registration of such phenomena; that the published Summaries may fairly represent the whole of Scotland. Observation ought to be confined to individual trees and shrubs; to particular species of birds; and, in the case of crops, to specified sorts reared from year to year on a selected piece of ground or farm.

The Council recommend that *year 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, 20th November 1872.

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,		
Bountree or Elder,		Black Currant,			Curlew,		
Broom,		Cherry,			House-Swallow,		
Hazel,		Gean,			Lapwing,		
Hawthorn,		Gooseberry,			Plover,		
Holly,		Peach,			Sand-Martin,		
Laburnum,		Pear,			Starling,		
Lilac,		Plum,			Swan,		
Mezereon,		Strawberry,			Rail or Corn Crane,		
Mountain Ash or Rowan,							
Red Flowering Currant,							
Rhododendron Ponticum,							
Whin,							

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.

EDINBURGH

General Post Office Buildings,

Secretary of the Meteorological Society of Scotland,

MR ALEXANDER BUCHAN,

Dec 1872

7E
EDINBURGH
JA 4
73

76

78

79

80

81

82

83

84

85

86

87

88

89

90

91

92

93

94

95

96

97

98

99

100