



# INSTRUCTIONS FOR TAKING METEOROLOGICAL OBSERVATIONS,

WITH REMARKS ON THE USE OF INSTRUMENTS

January 1868

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*Mr ALEXANDER BUCHAN*

*Secretary of the Meteorological Society of Scotland,*

## EDINBURGH.

BOOK-POST

Have the goodmuss also to state any information you may be able to collect relative to the Crops of Gram, 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.

OBSERVATIONS IN CONNECTION WITH THE PERIODICAL RETURN OF THE SEASONS.

mercury to whom a quartet or the top of one inch or one foot, Thermometers, especially of the wet and dry *ways*, must be taken 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

on one scale, that one is from the A.V.P.; and that its force on the scale 0-6 is "4"; *i.e.*, that it is *blowing fresh*.  
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*Remarks.*—The "Remarks" column is too narrow, but unavoidably so. Some of the most valuable observations that can be made at an observatory.













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The *index-tube* 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 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

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STANDARD GUIDE TO TAXONOMY AND SYSTEMATICS OF ENTOMOLOGICAL OBSERVATIONS

WITH REMARKS ON THE USE OF INSTRUMENTS.

Chesham  
June 1868

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Mr ALEXANDER BUCHAN

Secretary of the Archaeological Society of Scotland,

EDINBURGH.

## BOOK-POST.

FOREST TREES.	In Pines	Lead Buds	Leaves	In Leaf	Dressed or meadowing wadery.	Sowing or Planting.	Applying soil over Ground	In Flower,	First Cut	or Last cut.
Alder,	.	.	.	.	Barely,	.	.	Barely,	.	.
Ash,	.	.	.	.	Bere or Bliggs,	.	.	Bere or Bliggs,	.	.
Beech,	.	.	.	.	Oats,	.	.	Wheat,	.	.
Birch,	.	.	.	.	Benns,	.	.	Pearns,	.	.
Elm,	.	.	.	.	Beans,	.	.	Potatoes,	.	.
Hazel,	.	.	.	.	Wheat,	.	.	Turndips,	.	.
Ivy,	.	.	.	.	Oats,	.	.	Rye Grass,	.	.
Jacch,	.	.	.	.	Wheat,	.	.	Turnips,	.	.
Larch,	.	.	.	.	Wheat,	.	.	Potatoes,	.	.
Maple,	.	.	.	.	Wheat,	.	.	Pearns,	.	.
Oak,	.	.	.	.	Wheat,	.	.	Pearns,	.	.
Rowan,	.	.	.	.	Wheat,	.	.	Pearns,	.	.
Sycamore or Plane,	.	.	.	.	Wheat,	.	.	Pearns,	.	.

Review

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Marshall  
June 1868

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Oak,	.	.	.	.	Wheat,	.	.	Pearns,	.	.
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Sycamore or Plane,	.	.	.	.	Wheat,	.	.	Pearns,	.	.

Review

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# SCOTTISH METEOROLOGICAL SOCIETY.

Observations taken at Thompson, River, County of \_\_\_\_\_, in Lat.  $62^{\circ}2' \frac{1}{4}$ , Long.  $64^{\circ}3' \frac{8}{9}$ , Distance from Sea 120 feet miles.

Height of Cistern of the Barometer above Mean Sea-level 12 feet, above Ground 5 feet.

During the MONTH of

18 68

The Hours of Observation are of Greenwich Time. (*unwritten*)

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NOTATION USED IN GENERAL REMARKS.

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denotes	aurora.	m.	denotes	meteor.
"	cirrus.	ms.	"	meteors.
eu.	cirro-cumulus.	n.	"	nimbus.
s.	cirro-stratus.	r.	"	rain.
s.	cumulus.	h. r.	"	heavy rain.
s.	cumulo-stratus.	c. h. r.	"	continued heavy rain.
"	dew.	s	"	stratus.
"	fog.	sc.	"	scud.
r.	frost.	sl.	"	sleet.
"	hoar-frost.	sn.	"	snow.
"	haze.	so. ha.	"	solar halo.
"	heavy dew.	sq.	"	squall.
"	hail.	sqs.	"	squalls.
"	lightning.	t.	"	thunder.
cl.	light clouds.	t.-s.	"	thunder-storm.
sh.	light showers.	w.	"	wind.
co.	lunar corona.	g.	"	gale of wind.
ha.	lunar halo.			

**TABLE FOR ESTIMATING FORCE OF WIND.**

Common Designation.	Estimated Force, 0-6.	Common Designation.	Estimated Force, 0-6.	Common Designation.
Calm	1.5	Light breeze	4	Blowing hard
Very light wind	2	Strong breeze	5	Blowing gale

<b>BAROMETER,</b> "corrected Mean" at 9 A.M., <i>minus</i> the Correction ++ } for Temp. (Col. 2), = .29.47.5 - .07.6 } = 29.909
"Corrected Mean" of Barometer at 9 P.M., <i>minus</i> the Correction ++ } for Temp. (Col. 4), = .29.46.2 - .07.9 } = 29.884
<b>Mean at Station, corrected, and at 32°, .....</b> = 29.897
Correction for height,                   feet, above Mean Sea-level, ..... = 13
<b>Mean, reduced to 32°, and Sea-level, .....</b> = 29.910
Highest Reading, corrected for Index error, on the 1 <sup>st</sup> , ..... = 30.510
Lowest Do.,                             Do.,                             on the 20 <sup>th</sup> , ..... = 29.432
Difference, or Monthly Range, ..... = 6.078

<b>S.-R. THERMOMETER,</b> (in shade, etc.), <b>Highest in Month</b> , (corrected for Index Errors), on the 1 th,.....	=	<u>64</u>
<b>Lowest in Month</b> , corrected for Index errors, on the 24 th, .....	=	<u>41</u>
Difference, or <b>Monthly Range</b> , .....	=	<u>23</u>
" Corrected <b>Mean</b> " of all the <b>Highest</b> , (Col. 5), .....	=	<u>56.2</u>
" Corrected <b>Mean</b> " of all the <b>Lowest</b> , (Col. 6), .....	=	<u>47.6</u>
Difference, or <b>Mean Daily Range</b> ,.....	=	<u>8.6</u>
** Calculated <b>Mean Temperature</b> of Month, .....	=	<u>51.9</u>

<b>HYGROMETER, Mean</b> (corrected) A.M. and P.M. Reading of Dry Bulb, (Cols. 9 and 11), .....	=	51.7
<b>Mean</b> (corrected) A.M. and P.M. Reading of Wet Bulb, (Cols. 10 and 12), .....	=	49.3
†† Computed Temperature of Dew-Point, .....	=	46.9
†† Do. Elastic Force of Vapour, .....	=	0.322
†† Do. Weight of Vapour in a Cubic Foot of Air, .....	=	3.6
†† Relative Humidity, (Saturation = 100), .....	=	83.9

IN less than Days; Amount in inches									—	\$,79		
WIND.	SUMMARY.											
	Direction	N	NE	E	SE	S	SW	W	NW	Calm or Variable.	Mean Force.	Mean Velocity in miles per day.
A.M.	-"	2	-"	2	4	17	5	1				
P.M.	1	1	1	2	4	10	11	1				
Mean.	0.5	1.5	0.5	2	4	13.5	8	1				

*Observations made and  
Return verified by*

(Signed)

# INSTRUCTIONS FOR TAKING METEOROLOGICAL OBSERVATIONS, BY THE STATION OF THE UNITED STATES.

WITH REMARKS ON THE USE OF INSTRUMENTS.

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Secretary of the Meteorological Society of Scotland,

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OBSERVATIONS IN CONNECTION WITH THE PERIODICAL RETURN OF THE SEASONS

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One of the objects of immediate importance that the "Scottish Registering the greatest heat from the sun's rays, and the least nonconduciveness of clouds will be found on the other side. The Meteorological Society" has proposed to itself is to secure a from radiation during night. Their bulbs have a black coating, amount of cloud in the atmosphere ought to be estimated from *perfect uniformity* in the system of observation pursued at all times which may easily be made, or mended, by the application of a greater or less obscuration of the sky *overhead* (*i.e.*, within Stations. A certain degree of uniformity is absolutely necessary mixture of lamp black and printer's ink). They are placed in 20° or 30° of the zenith). The stars or clouds that appear near to justify the publication of Monthly Results from different stations, whose sites protect the bulbs from the horizon are viewed obliquely and thus being unable to judge observations; and it is found that differences between the winds. The "Minimam" should be freely exposed to the sun; of their amount, we ought not to take them into account in the same manner as to and the "Maximam" should rest on wooden supports a few clouds' column; though their appearances and changes ought to render them quite incomparable.

in the position of instruments, different hours of Snow must not be allowed to cover either of these Thermometers; instruments. It is therefore hoped that those persons who distillation. and especially the "Minimam." Thermometers ought frequently to be compared with the dry bulb of the Hygrometer. The observations to the Society will be as scrupulous 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 Time only twice daily 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 will 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 daily for some, and once (morning or evening) for the Society, an entire comparableness among the an instrument. Retracts, without which the Society's Reports must undergo repairs, are very liable to be and Direction, *2, W.* (for example) will indicate that the instrument. It is therefore hoped that those persons who distillation. and especially the "Minimam." Thermometer by used for Meteorological purposes till it has been carefully tested by comparison with a Standard Thermometer. When such a comparison is made, the thermometer is 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 Secretaries.

The Hygrometer consists of two Thermometers usually, but not necessarily, mounted on one frame. As apparently slight deviations from the approved and *allowed form* of this apparatus seriously irritate the Hygrometric Deductions, Observers are specially requested to attend to the following directions:

*Barometer.*—*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 observations in the lower regions from W., with one-third the (extreme) speed of the former. Again, in the second "Cloud," observations 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 *canalized stratus* kind.

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*Observations in Connection with the Periodic Return of the Seasons.*—possess not only great scientific value, but are of considerable interest to the Agriculturalist. The Council recommend that *temp day* observations be taken, either in two months, otherwise unceas'd, or in two days off for the purpose, from that time unceas'd. It is intended that observations by the Observatory should be entered in this manner or on the site of the Observatory, in the vicinity of an Observatory, the height of clouds and the snow-line in winter ought to be recorded.

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One of the objects of immediate importance that the "Scottish Registering the greatest heat from the sun's rays, and the least nonconduciveness of clouds will be found on the other side. The

Meteorological Society" has proposed to itself is to secure a from radiation during night. Their bulbs have a black coating, amount of cloud in the atmosphere ought to be estimated from *perfect uniformity* in the system of observation pursued at all times which may easily be made, or mended, by the application of a greater or less obscuration of the sky *overhead* (*i.e.*, within Stations. A certain degree of uniformity is absolutely necessary mixture of lamp black and printer's ink). They are placed in 20° or 30° of the zenith). The stars or clouds that appear near to justify the publication of Monthly Results from different stations, whose sites protect the bulbs from the horizon are viewed obliquely and thus being unable to judge observations; and it is found that differences between the winds. The "Minimam" should be freely exposed to the sun; of their amount, we ought not to take them into account in the same manner as to and the "Maximam" should rest on wooden supports a few clouds' column; though their appearances and changes ought to render them quite incomparable.

in the position of instruments, different hours of Snow must not be allowed to cover either of these Thermometers; instruments. It is therefore hoped that those persons who distillation. and especially the "Minimam." Thermometers ought frequently to be compared with the dry bulb of the Hygrometer. The observations to the Society will be as scrupulous 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 Time only twice daily 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 will 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 daily for some, and once (morning or evening) for the Society, an entire comparableness among the an instrument. Retracts, without which the Society's Reports must undergo repairs, are very

# SCOTTISH METEOROLOGICAL SOCIETY.

Observations taken at Thornton, County of Linlithgow, in Lat. 60° 21', Long. 6° 43' 8", Distance from Sea 120 miles.

Height of Cistern of the Barometer above Mean Sea-level 12 feet, above Ground 5 feet.

During the MONTH of September 1868.

The Hours of Observation are of Greenwich Time (London).

ELECTRICITY. Days of Month.	BAROMETER.			SELF-REGISTERING THERMOMETERS. Read Daily, at 9 P.M.			HYGROMETER. No. 831-37			WIND.			RAIN.			CLOUDS.			THERMOMETERS. under Ground.			SEA. No. 830			OZONE.			GENERAL REMARKS. Mention the hour at which Storms began and ended.			
	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.		9 h. A.M.		9 h. P.M.				
	Barometer, No. 91	Attached Ther- mometer No. 11	Barometer, No. 11	Attached Ther- mometer No. 11	Max. in Sun's rays No. 745	Min. on Grass, No. 5237	Dry bulb., No. 745	Wet bulb., No. 5237	Dry bulb., No. 745	Wet bulb., No. 5237	Direction, No. 745	Force No. 745	Dry bulb., No. 745	Wet bulb., No. 5237	Direction, No. 745	Force No. 745	No. of hours in which it fell.	Amount in inches, (0-6), and Direc- tion, and Species No. 745	Velocity, (0-6), Amount (0-10), and Direc- tion, and Species No. 745	Velocity, (0-6), Amount (0-10), and Direc- tion, and Species No. 745	Hours.	SUNSHINE.	No. 3 inches.	No. 12 inches.	No. 22 inches.	Temperature of WELL at 9 A.M. at Fathoms, and Density, No. 745	Temperature at 9 P.M.	As to occurrence of Thunder, Lightning, Storms, Hail, Meteors, Remarkable Depression or Elevation of Barometer, Prevalent Diseases, etc.			
1	29.710	52.8	30.026	59	51	42	50	47	46.8	44.9	NW	1.5	NW	0.8	0.07															1	
2	30.034	52.8	30.028	59	55	43	52.1	51.2	53.2	52.7	SW	1	SW	1.5	0.13															2	
3	29.712	56.1	29.902	59			53.5	52.2			S	2	SW		Rain																3
4	29.954	51	29.570	57.8	52	43.5	50.4	49	38	38	SW			48	0.44															4	
5	29.732	55	30.046	59.2	54	45.5	51.2	49.9	50.2	48.2	SW	4	SW	2	0.10															5	
6	30.102	54.8	30.006	57	52	46.5	48.3	47.2	49	48.3	32	0.8	NE	1	0.51															6	
7	29.964	55	30.040	58	53.5	48	50	48.4	50.5	48	W	0.8	W	0.8	0.21															7	
8	30.112	54.8	30.338	59	52	46	51	49	48.3	45	NW	0.8	NW	1	0.42															8	
9	30.056	55.2	30.140	60.2	53.5	48	52	50.6	50.7	48.7	SW	5	W	4	0.19															9	
10	29.916	56	30.042	59	52	47	51	48.7	49	44.5	W	1.5	W	1	0.75															10	
11	30.182	50	30.410	52	46	36	42.6	37	36	34	NE	0.8	NW	0.8	-															11	
12	30.596	47.5	30.050	55.2	41	29.5	46	40.9	45.6	45.7	W	0.8	W	0.8	-															12	
13	30.240	51.2	30.230	53	51	39.5	50	44.9	41.8	39.5	SW	0.8	SW	0.8	-															13	
14	30.232	51.2	30.182	55	49	38	48	45.6	44	42	Calm	0	Calm	0	-															14	
15	30.514	52	30.358	55.2	49	42.5	45	42.8	48	42.5	Calm	0	Calm	0	-															15	
16	30.302	53	30.182	58	53	43	51.2	48	50	47.8	NW	0.8	SW	0.8	-															16	
17	30.144	53.5	30.168	55.8	51	46	50.9	47.3	48	43.8	N	0.8	NE	0.8	0.01															17	
18	30.176	52.7	30.216	55	50	46.5	48.6	45.5	48.8	45.8	NW	2	NE	1	-															18	
19	30.214	53.7	30.300	54	50	45	49.8	48	47.8	47.8	NE	1.5	NE	1	0.10															19	
20	30.302	54	30.282	55.5	48	46	47.5	46.8	47	45.4	NE	1.5	NE	1	0.11															20	
21	30.260	53.4	30.208	56	49	45	47.3	45.2	46	44.8	E	1	E	1	0.02															21	
22	30.134	52	30.064	54	50	45	47.2	45.2	48	46.8	E	1	E	0.8	0.19															22	
23	29.944	53.5	29.916	58	51	46.8	48	47.7	46.8	45.9	NE	0.8	NE	0.8	0.03															23	
24	29.878	52	29.925	56	48	44	47.6	45	45	42.2	NE	1.5	NE	2	0.12															24	
25	29.956	51	29.912	53.5	48.5	41	47.2	44.5	43.8	37	NE	3	NE	3	0.14															25	
26	29.974	52																													

# 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 for 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 observed. Observers will be scrupulous in giving full 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 comparability among the several Returns, without which the Society's Reports must inevitably fail in achieving one of the main objects of Meteorological Observation.

*Law 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. For comparison of Thermometers, a property tested Thermometer must be used, without being re-tested. The self-registering, punctuality in the time of reading the instruments will be Secrecy.

The Thermometer consists of two Thermometers usually, but not necessarily, mounted on one frame. As apparently slight deviations from the approved and well-known form of this apparatus seriously vitiate the Hydrometrical Definitions. Observers, accordingly 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 except 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 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 sole objection is that it will not 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 sense of the cistern. When site tip of the index or column of mercury. The reading of the index-line on this little piston-and-screw is then to be taken, and the scale, to form one straight line with those on the fixed 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 in the height of the cistern, due to the want of care in fitting the instrument, will vitiate the readings of the thermometer.

When a Barometer having adjustable surfaces has to be removed from its frame, the ivory peg must be screwed so as to form a tight plug to the cistern. Then *screw up* the tube, 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 in the height of the cistern, due to the want of care in fitting the instrument, will vitiate the readings of the thermometer.

The instrument so that the mercury strikes the top of the glass tube, a sharp tap is produced. If this is prevented by air it temperature in the 24 hours preceding. It is not a matter of mercury to within a quarter of an inch of the top of the tube, Thermometers are read, and take down the instrument; it may then be carried with the cistern upright. 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 glass tube, 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 in the height of the cistern, due to the want of care in fitting the instrument, will vitiate the readings of the thermometer.

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The above remarks apply equally to the Thermometers for

Shaw  
Sept 1862

To

Mr ALEXANDER RUTHVEN

Secretary of the Meteorological Society of Scotland,

EDINBURGH.

BOOK-POST.

SHIP LETTER



Please state any information you may be able to collect relative to the Crosses of Grail, Holy, Pottoos, etc., whether these names are also to state any information you may be able to collect relative to the districts generally.

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# INSTRUCTIONS FOR TAKING METEOROLOGICAL OBSERVATIONS.

WITH REMARKS ON THE USE OF INSTRUMENTS.

One of the objects of immediate importance that the "Scottish Registering the greatest heat from the sun's rays and the least temperature of clouds will be found on the other side." The *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 Returns from different observations; and it is found that differences between the results from any two Stations, so very considerable as to and the "Minimum" should be freely exposed to the sun, of their amount, we ought not to take them into account 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 one of the main objects of Meteorological Observation.—The Council recommend that Observations be made precisely at 9 o'clock (Greenwich or Railway Time only) twice daily 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; and they are specially requested to mark opposite every reading at what time it was taken, "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. No. 60, any Barometer used for Meteorological Observations, must be used with such means of *adaptation or conversion*; 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 Barometer and approved by the Council; if properly tested and attended to, they are both well adapted to Meteorological purposes.

An excellent Barometer is constructed by Mr. Albie of London, the use of which is attended with the great convenience of requiring no adjustment of the cistern. Its *scales-and-screws* are not true of observation. From the film of ice thus formed evaporation will proceed from the most cloth in ordinary circumstances, 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 tube on this little piston-rod is brought out, the adjusting-screws 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 of the cistern.

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 tube, mercury to within a quarter of an inch of the top of the tube, thermometers, especially of the wet and dry bulb, must be taken off, and take down the instrument; it may then be carried with the rapidly taken, being set readily affected by heat from the person of the observer.

*Hour of observing Temperature.*—The Hygrometer is read at the end of the *index* which is next to the surface of the mercury or alcohol is alone noted. The reading of the index, or alcohol, is alone noted. The reading of the thermometer, especially of the wet and dry bulb, must be taken off, and 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 temperature, it is then removed to the cistern, and got rid of, by inventing the difference when the self-registering Thermometer is first tightened, 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 table 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 cistern, which must be carefully adjusted to form exactly a tangent to the convex surface of the mercury in the cistern. 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 recommends Self-Registering Thermometers and Hygrometers to be enclosed in a Box, painted white outside, and black within, and fixed 4 feet above grass in an exposed position, free from merely local influences. The laths forming the sides and doors of the Boxes are arranged so as at once to "protect" the Lind's Anerometer is also recommended; the method of *Lind's* mounting Wind Force by such tables as that given in the schedule is, to say the least, unsatisfactory.

*Rain-gauge.*—Many causes conspire to produce anomalies in rain returns. They arise partly from unfavourable situation of the gauge; partly from the defective nature of the instruments used. It is, indeed, difficult to obtain an unequivocal position for the range-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 placed in a quiet spot, and the readings entered in the returns on the day on which the rain fell.

*Snow-fall.*—Convenient 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 be squared against, and may be easily remedied by an observer, when the column of spirit breaks, it may be re-united by striking affixed to the depth of water received in gauge. The depth of the instrument repeatedly against the palm of the hand; when the part of the spirit distils by high temperature, it will be found in the upper bore, and must be dislodged in addition to, and as a check upon, the observations.

*Clouds.*—Convenient for observations only; and nothing that partakes of the nature of deduction or inference.

(By Order)

EDINBURGH, 9th December 1865.

Thos. Buchan  
Oct. 1868.

To  
F. G. BUCHAN  
631

SHIP LETTER

Mr ALEXANDER BUCHAN

Secretary of the Meteorological Society of Scotland,

EDINBURGH.

BOOK-POST.

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Have the goodness also to state any information you may be able to collect relative to the Crops of Gratin, Hay, Potatoes, Turnips, Peas, etc., whether perfectly, or in perfection; whether any have suffered from blight, disease, etc. Whether potatoe blight, disease, etc., and the Agouti condition of the districts generally.

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# SCOTTISH METEOROLOGICAL SOCIETY.

Observations taken at Moskow Town, County of Franklin, in Lat.  $42^{\circ} 15'$ , Long.  $6^{\circ} 45'$ , Distance from Sea 100 fms. miles.

Height of Cistern of the Barometer above Mean Sea-level 12 feet, above Ground 5 feet.

During the MONTH of December

The Hours of Observation are of Greenwich Time ~~and~~

Sums.	907,360	1462,	907,610	1625,	1306,	1049,					
Means.	29,210	47,1	29,245	52,8	42,1	33,6					
† Total Corrections for Instrumental Errors.											
‡ Corrections for Diurnal Range.											
"Corrected Means."											
No. of Column.	1	2	3	4	5	6	7	8	9	10	11

<b>S.-R. THERMOMETER,</b> (in shade, etc.), <b>Highest in Month</b> , (corrected for Index Errors), on the 1 <sup>st</sup> , 2 <sup>nd</sup> and 15 <sup>th</sup> .....	=	<u>47</u>
<b>Lowest in Month</b> , corrected for Index errors, on the 6 <sup>th</sup> , 10 <sup>th</sup> and 11 <sup>th</sup> .....	=	<u>25</u>
Difference, or <b>Monthly Range</b> , .....	=	<u>22</u>
" Corrected <b>Mean</b> " of all the <b>Highest</b> , (Col. 5), .....	=	<u>42.1</u>
" Corrected <b>Mean</b> " of all the <b>Lowest</b> , (Col. 6), .....	=	<u>33.6</u>
Difference, or <b>Mean Daily Range</b> , .....	=	<u>8.5</u>
** Calculated <b>Mean Temperature</b> of Month .....	=	<u>37.9</u>

<b>HYGROMETER, Mean</b> (corrected) A.M. and P.M. Reading of Dry Bulb, (Cols. 9 and 11), .....	=	39.1
<b>Mean</b> (corrected) A.M. and P.M. Reading of Wet Bulb, (Cols. 10 and 12), .....	=	37.8
†† Computed Temperature of Dew-Point, .....	=	36.1
†† Do. Elastic Force of Vapour, .....	=	0.213
†† Do. Weight of Vapour in a Cubic Foot of Air, .....	=	2.74
†† Relative Humidity, (Saturation = 100), .....	=	89.6

SUMMARY.											
WIND.	N	NE	E	SE	S	SW	W	NW	Calm or Variable.	Mean Force.	Mean Velocity in miles per day
A.M.	5	4	2	13	1	2	2	2		1,9	
P.M.	2	6	1	12	1	3	2	3	1	2,1	
Mean.	3.5	5	4.8	12.5	1	2.5	2	2.5	0.5	2	

*Observations made and  
Return verified by*

(Signed)

