

SCOTTISH METEOROLOGICAL SOCIETY.

Observations taken at Edinburgh, County of Midlothian, in Lat. 57°16'N, Long. 2°22'W; Distance from Sea 13 1/4 miles.Height of Cistern of the Barometer above Mean Sea-level 220 feet, above Ground 24 feet.During the MONTH of January 1865.

The Hours of Observation are of Greenwich Time.

ELECTRICITY.	Days of Month.	BAROMETER.				SELF-REGISTERING THERMOMETERS. Read daily, at 9 P.M.				HYGROMETER. No. 99				WIND.				RAIN.		CLOUDS.				THERMOMETERS. under Ground.			SEA.	OZONE. 0-10.	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 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. _____	Attach- ed ther- mometer	Max. No. 10 _____	Min. No. 10 _____	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. _____	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. 1 _____	No. 2 _____					No. 3 _____																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																										
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BAROMETER, "corrected Mean" at 9 A.M., minus the Correction ++ for Temp. (Col. 2), = 29.014
"Corrected Mean" of Barometer at 9 P.M., minus the Correction ++ for Temp. (Col. 4), = 28.963
Mean at Station, corrected, and at 32°, = 28.988
Correction for Height, 220 feet, above Mean Sea-level, = .241
Mean, reduced to 32°, and Sea-level, = 29.229
Highest Reading, corrected for Index error, on the 1st th, = 29.672
Lowest Do., Do., on the 14th, = 27.948
Difference, or Monthly Range, = 1.724

S.-R. THERMOMETER, (in shade, etc.), Highest in Month (corrected for Index errors), on the 7th, = 47.9
Lowest in Month, corrected for Index errors, on the 17th, = 27.8
Difference, or Monthly Range, = 20.1
"Corrected Mean" of all the Highest, (Col. 5), = 27.6
"Corrected Mean" of all the Lowest, (Col. 6), = 27.6
Difference, or Mean Daily Range, = 10.0
* Calculated Mean Temperature of Month, = 32.6

S.-R. THERMOMETER, Black Bulb, in Sun, Highest, (corrected, for Index errors), on the 7th, = 5
"Corrected Mean," (Col. 7), of Black Bulb, Max. in Sun, = 5
Lowest at Night, Black Bulb, (corrected for Index errors), on the 7th, = 7
"Corrected Mean," (Col. 8), of Black Bulb Min. on grass, = 7
Difference of above Means or Range ("exposed"), = 2

HYGROMETER, Mean (corrected) A.M. and P.M. Reading of Dry Bulb, = 36.0

Mean (corrected) A.M. and P.M. Reading of Wet Bulb, = 34.7

†† Computed Temperature of Dew-point, = 32.7

†† Do. Elastic Force of Vapour, = 1.15

†† Do. Weight of Vapour in a Cubic Foot of Air, = 2.1

†† Relative Humidity, (Saturation = 100), = 87

RAIN fell on 18 Days; Amount in Inches, = 1

WIND.		SUMMARY.									
Direction.		N	NE	E	SE	S	SW	W	NW	Calm or Variable.	Mean Force.
A.M.		7	1	0	3	3	6	4	3	4	1.5
P.M.											
Mean.											

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 2nd; 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)

January
Jan. 1865.

(By Order,) A. B.

Clouds. — Convenient abbreviations for Luke Howard's

must be hung perfectly horizontal; the bulb end should incline slightly downwards, rather than the other.

 T_{δ}

Mr ALEXANDER BUCHAN.

Secretary of the Meteorological Society of Scotland.

10, *St Andrew Square,*

EDINBURGH

BOOK-POST.

OBSERVATIONS IN CONNECTION WITH THE PERIODICAL RETURN OF THE SEASONS.

[illegible]

Have the goodness to state any information you may be able to collect relative to the crops of grain, hay, potatoes, turnips, fruit, etc., whether or in perfection; whether any have suffered from blight, disease, etc. Whether zootic disease prevails among cattle; and the agricultural condition of the district generally.

[illegible]

SCOTTISH METEOROLOGICAL SOCIETY.

Observations taken at Stranraer, County of Wigtown, in Lat. 55° 41' N, Long. 5° 22' W, Distance from Sea 13 1/4 miles.

Height of Cistern of the Barometer above Mean Sea-level 220 feet, above Ground 24 feet.

During the MONTH of February 1865.

The Hours of Observation are of Greenwich Time.

ELECTRICITY.	Days of Month.	BAROMETER.				SELF-REGISTERING THERMOMETERS. Read daily, at 9 P.M.				HYGROMETER. No. 44 1003				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 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.		Readings of the H-Cup Anemometer.		No. of hours in which it fell.	Amount in inches.	9 A.M.		P.M.		SUNSHINE. Hours.	9 h. A.M.																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																							
		Barometer. * No. _____	Attach- ed Ther- mometer	Barometer. No. _____	Attach- ed Ther- mometer	Max. No. 88 7.975	Min. No. 94 7.975	Max. in Sun's rays No. _____	Min. on Grass. No. _____	Dry bulb.	Wet bulb.	Dry bulb.	Wet bulb.	Direction.	Force			Direction.	Force	9 h. A.M.			9 h. P.M.		No. 3 inches.	No. 12 inches.					No. 22 inches.																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																															
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BAROMETER, "corrected Mean" at 9 A.M., minus the Correction ++ for Temp. (Col. 2), = 29.359
"Corrected Mean" of Barometer at 9 P.M., minus the Correction ++ for Temp. (Col. 4), = 29.347
Mean at Station, corrected, and at 32°, = 29.368
Correction for Height, 220 feet, above Mean Sea-level, = 24.1
Mean, reduced to 32°, and Sea-level, = 29.609
Highest Reading, corrected for Index error, on the 10 th, = 30.152
Lowest Do., Do., on the 1st th, = 28.544
Difference, or Monthly Range, = 1.608

S.-R. THERMOMETER, (in shade, etc.), Highest in Month (corrected for Index errors), on the 25 th, = 47.83
Lowest in Month, corrected for Index errors, on the 18 th, = 0.9
Difference, or Monthly Range, = 47.1
"Corrected Mean" of all the Highest, (Col. 5), = 27.6
"Corrected Mean" of all the Lowest, (Col. 6), = 20.0
Difference, or Mean Daily Range, = 9.6
** Calculated Mean Temperature of Month, = 32.8

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

HYGROMETER, Mean (corrected) A.M. and P.M. Reading of Dry Bulb, = 36.6
Mean (corrected) A.M. and P.M. Reading of Wet Bulb, = 35.6
Computed Temperature of Dew-point, = 34.2
Do. Elastic Force of Vapour, = 1.97
Do. Weight of Vapour in a Cubic Foot of Air, = 2.3
Relative Humidity, (Saturation = 100), = 91
RAIN fell on 18 Days; Amount in Inches, = 5.63

WIND.	SUMMARY.									
	Direction.	N	NE	E	SE	S	SW	W	NW	Calms or Variable.
A.M.		1	1	1	9	4	2	3	4	3
P.M.		2	3	0	5	0	4	0	4	10
Mean.		1 1/2	2	1/2	7	2	3	1 1/2	4	6 1/2

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 2nd; 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) James B. B. B.

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 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 Barometer, the sides of the *cistern* are of leather; and thus, by the aid of a screw acting on the bottom, the surface of the contained mercury can be adjusted to the *zero-point* of the fixed scale. The sides of the cistern are of brass, and a little ivory float, whose coincidence being indicated by a little ivory rod, 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 *venier*.

When a Barometer, having adjustable surfaces has to be removed from its fastenings, the ivory peg must be screwed so as to form a tight plug to the cistern. Then *seize 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 replaced.

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 *venier*; which must be carefully adjusted to form exactly a tangent to the convex surface of the mercury in the tube. Observations must be taken quickly; so as to prevent heat from the observer's hands and person from affecting the mercury. The use of a lens will greatly facilitate an accurate adjustment and reading of the Barometer.

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

Self-registering Thermometers.—Professor Phillips's, and Negretti and 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 in the upper lobe, 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. This instrument must be hung perfectly horizontal; the bulb end should incline slightly downwards, rather than the other.

OBSERVATIONS.

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*," 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.* (*c-p*) 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.

Shading.—The number of hours in which objects in the sun's rays cast shadows, should be entered in the proper column.

Underground Thermometers.—As the germination and health of crops and plants greatly depend on the temperature of the soil,—its amount and constancy; the Council recommend that observations in this interesting department be made at 9 A.M., by thermometers placed in the earth, their bulbs being sunk to 3, 12, and 22 inches, and the stems above ground protected from the sun's rays, and fitted with sloping tin collars, to prevent rain-water being conveyed to the bulbs by the stems or wooden frames. Mention must be made of the geological formation and agricultural condition of the soil in which these thermometers are placed.

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

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

Ozone.—Mention whether Schönbain's or Moffat's papers are used. Moffat's are preferred. 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 5 $\frac{1}{2}$; 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 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 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 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 *term-day* observations be taken;—viz., on the 21st days of March, June, September, and December. For these hourly observations separate schedules will be furnished to observers.

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

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

(By Order) A. B.

EDINBURGH, 9th December 1865.

FOREST TREES.		FRUITS.		MIGRATORY BIRDS.	
In flower.	In leaf.	First in blossom.	First in fruit.	First in flight.	Departure.
Alder,.....	Barley,.....	Cuckoo,.....	Curtew,.....	House-Swallow,.....	Lapwing,.....
Beech,.....	Oats,.....	Pease,.....	Turnips,.....	Rye Grass,.....	Sycamore or Plane,.....
Birch,.....	Wheat,.....	Beans,.....	Potatoes,.....	Lime,.....	Oak,.....
Burn,.....	Barley,.....	Pease,.....	Potatoes,.....	Lime,.....	Oak,.....
Cherry,.....	Barley,.....	Pease,.....	Potatoes,.....	Lime,.....	Oak,.....
Apple,.....	Barley,.....	Pease,.....	Potatoes,.....	Lime,.....	Oak,.....
Bramble,.....	Barley,.....	Pease,.....	Potatoes,.....	Lime,.....	Oak,.....
Broom,.....	Barley,.....	Pease,.....	Potatoes,.....	Lime,.....	Oak,.....
Black Currant,.....	Barley,.....	Pease,.....	Potatoes,.....	Lime,.....	Oak,.....
Gooseberry,.....	Barley,.....	Pease,.....	Potatoes,.....	Lime,.....	Oak,.....
Holly,.....	Barley,.....	Pease,.....	Potatoes,.....	Lime,.....	Oak,.....
Laburnum,.....	Barley,.....	Pease,.....	Potatoes,.....	Lime,.....	Oak,.....
Plum,.....	Barley,.....	Pease,.....	Potatoes,.....	Lime,.....	Oak,.....
Strawberry,.....	Barley,.....	Pease,.....	Potatoes,.....	Lime,.....	Oak,.....
Mountain Ash or Rowan,.....	Barley,.....	Pease,.....	Potatoes,.....	Lime,.....	Oak,.....
Red Flowering Currant,.....	Barley,.....	Pease,.....	Potatoes,.....	Lime,.....	Oak,.....
Rhododendron Ponticum,.....	Barley,.....	Pease,.....	Potatoes,.....	Lime,.....	Oak,.....
Whin,.....	Barley,.....	Pease,.....	Potatoes,.....	Lime,.....	Oak,.....

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; and the Agricultural condition of the district generally.

BOOK-POST.

EDINBURGH.

10, St Andrew Square,

Secretary of the Meteorological Society of Scotland,

Mr ALEXANDER BUCHAN,

79

6 Murray
St. 1. 1865

SCOTTISH METEOROLOGICAL SOCIETY.

Observations taken at Stranraer, County of ArgyllHeight of Cistern of the Barometer above Mean Sea-level 220 feet, above Ground 24 feet.During the MONTH of March

1865.

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 began and ended.	Days of Month.																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																												
		9 h. A.M.		9 h. P.M.		Protected, in Shade, 4 feet above Ground.		Exposed Black Bulbs.		9 h. A.M.		9 h. P.M.		9 h. A.M.		9 h. P.M.		Readings of the H-Cup Anemometer.		No. of hours in which it fell.	Amount in inches.	9 A.M.			P.M.		9 h. A.M.																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																
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BAROMETER, "corrected Mean" at 9 A.M., minus the Correction++
for Temp. (Col. 2), = 29.467
"Corrected Mean" of Barometer at 9 P.M., minus the Correction++
for Temp. (Col. 4), = 29.411
Mean at Station, corrected, and at 32°, = 29.439
Correction for Height, 220 feet, above Mean Sea-level, = 2.41
Mean, reduced to 32°, and Sea-level, = 29.680
Highest Reading, corrected for Index error, on the 20 th., = 29.976
Lowest Do., Do., on the 5 th., = 29.674
Difference, or Monthly Range, = 1.302

S.-R. THERMOMETER, (in shade, etc.), Highest in Month (corrected for
Index errors), on the 30 th., = 53.4
Lowest in Month, corrected for Index errors, on the 27 th., = 23.5
Difference, or Monthly Range, = 29.9
"Corrected Mean" of all the Highest, (Col. 5), = 41.3
"Corrected Mean" of all the Lowest, (Col. 6), = 30.8
Difference, or Mean Daily Range, = 10.5
** Calculated Mean Temperature of Month, = 36.0

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

HYGROMETER, Mean (corrected) A.M. and P.M. Reading of Dry
Bulb, = 35.7
Mean (corrected) A.M. and P.M. Reading of Wet Bulb, = 34.2
Computed Temperature of Dew-point, = 31.9
Do. Elastic Force of Vapour, = 1.81
Do. Weight of Vapour in a Cubic Foot of Air, = 2.1
Relative Humidity, (Saturation = 100), = 86
RAIN fell on 19 Days; Amount in Inches, = 2.40

WIND.	SUMMARY.									
	Direction.	N	NE	E	SE	S	SW	W	NW	Calm or Variable.
A.M.		1	0	0	6	6	5	1	9	3
P.M.		1	1	0	4	3	4	0	9	9
Mean.		1	5	0	5	4	5	5	9	6

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 2nd; 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) James Bisset

INSTRUCTIONS

FOR TAKING METEOROLOGICAL

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 to every reading at what time it was taken, if not at 9 o'clock.

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

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

An excellent Barometer is constructed by Mr. Adie of London, the use of which is attended with the great convenience of requiring no adjustment of the cistern. Its *scale-inches* are not true inches, but so much shorter as to compensate the error that would otherwise arise from the fluctuations of the surface of mercury in the cistern. This form of instrument has been adopted by the Board of Trade, and has received the approval of the Meteorological Committee of the British Association. In another form of the Barometer, the sides of the *cistern* are of leather, and thus, by the aid of a screw acting on the bottom, the surface of the contained mercury can be adjusted to the *zero-point* of the fixed scale; their coincidence being indicated by a little ivory float, whose stem passes freely through the lid and case of the cistern. When 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 *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 *seize* up the mercury to within a quarter of an inch of the top of the tube, and take down the instrument; it may then be carried with the cistern uppermost. Before suspending the Barometer for use, it must be ascertained whether the space above the mercury in the tube is a complete vacuum; this is the case when, on inclining the instrument so that the mercury strikes the top of the tube, a *sharp tap* is produced. If this is prevented by air it may be removed to the cistern, and got rid of; by inverting the Barometer (care being taken to prevent the loss of mercury by tightening the ivory peg), and gently tapping it; and if this plan fails, the instrument must be repaired.

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

In taking an observation, the attached Thermometer is first noted: the tube must then be gently tapped and the cistern-adjustment carefully made. By raising and lowering the eye, it must be brought into the plane of the back and front of the index; 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 black within, and fixed 4 feet above grass in an exposed position, free from merely local influences. The lids forming the sides and doors of the Boxes are arranged so as to 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, the doors are also made to open to the south. These Boxes may be had at the Society's Office.

Self-registering Thermometers.—Professor Phillips's, and Negretti and 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 glass stem. 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 in the upper lobe, and must be dislodged from thence by heating that part over a lamp; the alcohol will evaporate and again condense in contact with the body of the liquid. This instrument must be hung perfectly horizontal; the bulb end should incline slightly downwards, rather than the other.

OBSERVATIONS.

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 (*extreme*) speed of the former. Again, in the second "*Cloud*" column, an entry of $\frac{1}{2}$, *cu-st.* (*c-p.*) 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 3rd, 13th, and 23rd 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 Schüben's or Moffat's papers are used—Moffat's are preferred. 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 5, *z.*, 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—10 is "4"; *i.e.*, that it is *blowing fresh*.

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

Remarks.—The "*Remarks*" column is too narrow, but unavoidably so. Some of the most valuable observations that can be taken are those for which no rules can be given nor hours assigned. The use of contractions ought, therefore, to be taken every advantage of, and a list of such as are recognised and in use at Greenwich and Southampton, are given at the foot of the column. Besides special and extraordinary observations, great prominence ought to be given in this column to prevalent diseases, differences in character, colour, velocity, and direction between the lower and upper strata of clouds, the colour of the sky, etc. Remarks ought to be made on the occurrence of 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 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. Observations ought to be confined to individual trees and shrubs; to particular species of birds; and, in the case of crops, to specified sorts reared from year to year on a selected piece of ground or farm.

The Council recommend that *year-day* observations be taken;—viz., on the 21st days of March, June, September, and December. For these hourly observations separate schedules will be furnished to observers.

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

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

(By Order.) A. B.

Bursnall, 9th December 1863.

OBSERVATIONS IN CONNECTION WITH THE PERIODICAL RETURN OF THE SEASONS.

FOREST TREES.	FRUIT.	FRUITS.	First in Blossom.	First in Fruit.	First in Ripeness.	Departure.
Alder,	Apple,	Black Currant,	Cuckoo,	Currant,	House-Swallow,	Lapwing,
Beech,	Cherry,	Cream,	Crookberry,	Holly,	Laburnum,	Lilac,
Birch,	Gooseberry,	Hazel,	Hawthorn,	Mountain Ash or Rowan,	Red Flowering Currant,	Rhododendron Ponticum,
Elm,	Juniper,	Laburnum,	Lilac,	Measey,	Mountain Ash or Rowan,	Red Flowering Currant,
Larch,	Laburnum,	Lilac,	Measey,	Mountain Ash or Rowan,	Red Flowering Currant,	Rhododendron Ponticum,
Oak,	Laburnum,	Lilac,	Measey,	Mountain Ash or Rowan,	Red Flowering Currant,	Rhododendron Ponticum,
Sycamore or Plane,	Laburnum,	Lilac,	Measey,	Mountain Ash or Rowan,	Red Flowering Currant,	Rhododendron Ponticum,

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SCOTTISH METEOROLOGICAL SOCIETY.

Observations taken at Inverury, County of Aberdeen, in Lat. 57°16'N., Long. 2°22'W., Distance from Sea 13 1/4 miles.

Height of Cistern of the Barometer above Mean Sea-level 220 feet, above Ground 24 feet.

During the MONTH of April 1865.

The Hours of Observation are of Greenwich Time.

ELECTRICITY.	Days of Month.	BAROMETER.				SELF-REGISTERING THERMOMETERS. Read daily, at 9 P.M.				HYGROMETER. No. 44				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 began and ended.	Days of Month.																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																	
		9 h. A.M.		9 h. P.M.		Protected in Shade, 4 feet above Ground.		Exposed Black Bulbs.		9 h. A.M.		9 h. P.M.		9 h. A.M.		9 h. P.M.		No. of hours in which it fell.	Amount in inches.	9 A.M.		P.M.			9 h. A.M.				Temperature of Air and Dewy Point	0-10.																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																			
		Barometer. * No.	Attached Thermometer	Barometer. No.	Attached Thermometer	Max. No. 89	Min. No. 94	Max. in Sun's rays No.	Min. on Grass. No.	Dry bulb.	Wet bulb.	Dry bulb.	Wet bulb.	Direction.	Force	Direction.	Force			9 h. A.M.	9 h. P.M.	Velocity (0-6), and Direction.	Amount (0-10), and Species.		Velocity (0-6), and Direction.	Amount (0-10), and Species.	No. 3 inches.						No. 12 inches.	No. 22 inches.																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																															
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BAROMETER, "corrected Mean" at 9 A.M., minus the Correction ++ for Temp. (Col. 2), = 29.630
 "Corrected Mean" of Barometer at 9 P.M., minus the Correction ++ for Temp. (Col. 4), = 29.577
 Mean at Station, corrected, and at 32°, = 29.604
 Correction for Height, 220 feet, above Mean Sea-level, = .241
 Mean, reduced to 32°, and Sea-level, = 29.845
 Highest Reading, corrected for Index error, on the 21st th, = 30.022
 Lowest Do., Do., on the 6th th, = 29.316
 Difference, or Monthly Range, = .712

S.-R. THERMOMETER, (in shade, etc.), Highest in Month (corrected for Index errors), on the 25th th, = 68.5
 Lowest in Month, corrected for Index errors, on the 15th th, = 24.6
 Difference, or Monthly Range, = 43.9
 "Corrected Mean" of all the Highest, (Col. 5), = 54.5
 "Corrected Mean" of all the Lowest, (Col. 6), = 35.8
 Difference, or Mean Daily Range, = 18.7
 ** Calculated Mean Temperature of Month, = 45.15

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

HYGROMETER, Mean (corrected) A.M. and P.M. Reading of Dry Bulb, = 44.4
 Mean (corrected) A.M. and P.M. Reading of Wet Bulb, = 42.1
 †† Computed Temperature of Dew-point, = 39.4
 †† Do. Elastic Force of Vapour, = .242
 †† Do. Weight of Vapour in a Cubic Foot of Air, = .28
 †† Relative Humidity, (Saturation = 100), = 82
 RAIN fell on 10 Days; Amount in Inches, = .0463

WIND.		SUMMARY.									
Direction.		N	NE	E	SE	S	SW	W	NW	Calm or Variable.	Mean Force.
A.M.		1	1	0	2	1	6	3	9	7	1.04
P.M.		5	1	2	1	2	2	6	2	9	.39
Mean.		3	1	1	1 1/2	1 1/2	4	4 1/2	5 1/2	8	.72
		3	1	1	1	2	4	5	5	8	

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 2nd; 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) James Bisset

OBSERVATIONS

The nomenclature of clouds will be found on the over side. The amount of cloud in the atmosphere ought to be estimated from the greater or less observation 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 *observations*, and so on. Observations of the clouds are made at 9 a.m. at sunset,

column, an entry of $\frac{x}{2}$, cu-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.

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

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

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.

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.

Besides special and extraordinary observations, great prominence ought to be given in this column to prevalent diseases, differences

and upper strata of clouds, the colour of the sky, etc. 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 as ought to be made on the occurrence of meteors, aurora borealis, or 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.

was unoccupied, or it was ruled off for the purpose, from the heated 'Remarks.' It is intended that observations by the Electrometer should be entered in this manner, or on the side-marginal. Additional remarks may be made on the margin. *Observations* in connection with the periodic return of the seasons, possess not only great scientific value, but are of considerable interest to the Agriculturist. The Council would direct the special attention of Observers to the registration of such phenomena; that the published Summaries may fairly represent the whole of Scotland. Observations ought to be confined to individual trees and shrubs; to particular species of birks; and, in the case of crops, to specified sorts reared from year to year on a selected piece of ground or farm.

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

OBSERVATIONS IN CONNECTION WITH THE PERIODICAL RETURN OF THE SEASONS.

[illegible]

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.

Mr ALEXANDER BUCHAN.

Secretary of the Meteorological Society of Scotland.

10, *St Andrew Square.*

EDINBURGH.

BOOK-POST.

The nomenclature of clouds will be found on the over 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 *cloud observation*, as so on.

Observations of the clouds are made at 9 A.M. and at sunset, and the *W* and *D* are observed immediately after sunset. As an illustration of the condition and currents of the upper and lower regions of the atmosphere. The entries in the schedule are to be made in the following manner:—In the column "Velocity and Direction," $\frac{6}{5}$ 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 $2, \frac{4}{3} \text{ sec.}$ (ϵ/ρ) 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 Thermometry.—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 atmosphere, 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 the water of river water. At or near the time of high water, on the 15th, 15th, 15th, and 25th of each month, the thermometer ought to be plunged, 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.

used. *Ozone*—Mention whether Schlemlein'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 3 w.e., 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* 4 m.p.h.

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

Remarks.—The "*Remarks*" column is too narrow, but un-avoidably so. Some of the most valuable observations that can be taken are those for which no rates 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 eitherwise 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-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; to particular species of birks; 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. For these hourly observations separate schedules will be furnished to observers.

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

The Council have agreed to recommend that observers, before purchasing new instruments, should communicate with the Meteorological Secretary; and they consider it desirable that he should have full power to reject any instrument which, on being presented for approval, does not afford him satisfaction.

SCOTTISH METEOROLOGICAL SOCIETY.

Observations taken at Inverury, County of Aberdeen, in Lat. 57° 16' N, Long. 2° 22' W, Distance from Sea 13 1/4 miles.

Height of Cistern of the Barometer above Mean Sea-level 220 feet, above Ground 24 feet.

During the MONTH of April May 1865.

The Hours of Observation are of Greenwich Time.

ELECTRICITY.	Days of Month.	BAROMETER.				SELF-REGISTERING THERMOMETERS. Read daily, at 9 P.M.				HYGROMETER. No. 44 Dryson				WIND.				RAIN.		CLOUDS.				THERMOMETERS. under Ground.			SEA.	OZONE. No. 44 Wright & Jones	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 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.		Readings of the H-Cup Anemometer.		No. of hours in which it fell.	Amount in inches.	9 A.M.		9 P.M.		9 h. A.M.											
		Barometer. * No.	Attach- ed Ther- mometer No.	Barometer. No.	Attach- ed Ther- mometer No.	Max. No.	Min. No.	Max. in Sun's rays No.	Min. on Grass. No.	Dry bulb.	Wet bulb.	Dry bulb.	Wet bulb.	Direc- tion.	Force (0-10).			Direc- tion.	Force (0-10).	Velocity (0-10), and Species.	Amount (0-10), and Species.	Velocity (0-10), and Species.	Amount (0-10), and Species.	No.	No.	No.							
																															inches.		
																															inches.		
1	29.396	49	29.278	61	50.1	35.2			50.2	44.8	48.6	47.4	S	1 1/2	S	2		0.00	1 1/2	10 mi	3.5	7 mi							1				
2	29.210	54 1/2	29.240	66	50.6	43.3			50.2	48.2	50.5	46.3	S	2	S	1		0.04	2	9 mi	5.5	10 mi								2			
3	29.250	57 1/2	29.150	62	55.6	44.2			53.1	50.4	49.7	48.6	S	2	S	1 1/2		0.25	3	10 mi	1.5	10 mi								3			
4	29.162	54	29.256	63 1/2	57.3	42.4			49.3	43.8	47.8	43.7	S	2	S	1		0.05	2 1/2	10 mi	0	0								4			
5	29.372	55	29.350	61	62.5	34.3			53.8	48.2	47.8	45.0	0	0	0	0		0.00	0	5 mi	5.5	10 mi								5			
6	29.396	55	29.496	59 1/2	48.5	42.7			46.0	45.6	44.6	44.0	S	1	0	0		2.30	1 1/2	10 mi	?	10 mi								6			
7	29.550	56	29.566	58	60.8	42.5			55.0	51.2	43.9	43.4	S	1 1/2	S	1 1/2		0.00	4 mi	7 mi	1 1/2	8 mi								7			
8	29.592	53 1/2	29.514	67	59.1	38.2			44.6	44.9	49.2	47.8	S	1	0	0		0.00	?	10 mi	?	10 mi									8		
9	29.524	55	29.438	57 1/2	51.2	43.6			46.5	44.8	44.6	41.5	S	1 1/2	S	1		0.00	1.5	10 mi	?	10 mi									9		
10	29.324	50 1/2	29.306	55 1/2	45.1	39.7			43.6	41.8	40.6	40.1	S	2	S	3		0.20	2 mi	10 mi	2 mi	10 mi									10		
11	29.338	47	29.450	54 1/2	44.4	39.6			44.0	43.9	41.8	40.8	S	1 1/2	S	2		0.35	1 1/2	10 mi	2 mi	10 mi									11		
12	29.532	45	29.574	53 1/2	45.7	39.4			42.4	40.2	41.8	39.9	S	2	S	1 1/2		0.00	2 1/2	10 mi	?	10 mi									12		
13	29.590	48	29.508	55	45.1	40.3			43.5	43.6	43.8	44.2	S	1 1/2	S	1		0.70	1 1/2	10 mi	?	10 mi									13		
14	29.496	53	29.250	57	56.0	40.7			48.0	46.8	46.2	42.0	S	1 1/2	S	1 1/2		0.00	1 1/2	10 mi	0	0									14		
15	29.108	52 1/2	29.018	59 1/2	52.3	39.3			50.0	46.4	45.1	43.2	S	2	0	0		0.15	1.5	10 mi	?	8 mi									15		
16	29.100	47	29.052	58 1/2	54.7	35.2			50.6	44.2	44.9	44.3	S	1 1/2	S	2		0.10	1 1/2	10 mi	3.5	10 mi									16		
17	29.126	54	29.218	62 1/2	59.0	41.3			54.7	49.3	47.2	45.9	S	1 1/2	S	1		0.35	1 1/2	10 mi	1.5	10 mi									17		
18	29.422	53 1/2	29.546	61	61.2	?			49.6	46.8	51.6	47.2	S	1	S	1		0.00	1 1/2	7 mi	1.5	10 mi									18		
19	29.516	57	29.612	60 1/2	59.7	42.5			52.1	47.7	55.8	53.1	S	2	S	1 1/2		0.00	2 1/2	10 mi	1 1/2	5 mi									19		
20	29.724	60 1/2	29.754	71 1/2	68.7	50.3			63.2	59.5	56.3	53.8	S	1	S	1 1/2		0.00	1 1/2	8 mi	0	0									20		
21	29.790	63	29.704	62	67.2	41.4			63.6	59.0	51.0	44.2	S	1 1/2	S	1 1/2		0.00	0	0	1 1/2	5 mi									21		
22	29.560	60 1/2	29.514	67	73.3	45.1			58.7	55.2	56.2	55.8	S	0	0	0		0.00	?	5 mi	0	0									22		
23	29.538	64	29.574	70	73.3	45.8			65.4	60.2	57.0	55.6	0	0	0	0		0.00	0	4 mi	0	0									23		
24	29.590	64	29.586	71	72.3	43.8			65.1	59.9	56.2	55.1	S	1 1/2	S	1 1/2		0.00	0	0	0	0									24		
25	29.584	65	29.532	68 1/2	74.6	45.2			65.4	61.1	60.4	58.6	S	1 1/2	S	1		0.00	0	0	0	0									25		
26	29.532	64 1/2	29.452	64	68.6	50.6			63.3	58.6	54.8	52.7	S	1 1/2	S	1		0.00	?	5 mi	1.5	10 mi									26		
27	29.330	62	29.252	65	71.8	47.4			53.2	53.1	54.0	51.9	S	1 1/2	S	1 1/2		0.10	?	10 mi	?	10 mi									27		
28	29.106	61	29.100	61 1/2	64.2	49.2			58.7	53.8	54.1	49.9	S	1 1/2	S	2		0.10	1 1/2	5 mi	1 1/2	10 mi									28		
29	29.268	56	29.212	58 1/2	59.8	45.2			56.6	51.8	45.9	46.1	S	1	S	1		0.10	1 1/2	9 mi	1 1/2	10 mi									29		
30	29.088	50 1/2	29.416	53	50.3	41.0			42.4	42.0	46.8	41.0	S	2	0	0		0.30	1 1/2	10 mi	?	5 mi									30		
31	29.530	50	29.650	50	50.4	32.5			48.1	44.8	42.0	40.8	S	1	S	1 1/2		0.09	1 1/2	9 mi	?	10 mi									31		
Sums.	911.644	1719	911.628	1890	1827.9	1266.9			1630.9	1531.6	1515.2	1458.9	3.5		30			2.018		217		44											
Means.	29.408	55.5	29.407	61.0	59.0	42.2			52.6	49.4	48.9	47.1	1.13		97					7		6.9											
† Total Corrections for Instrumental Errors.	?	?	?	?	+2	+3			+3	-1	+3	-1																					
† Corrections for Diurnal Range.	?	?	?	?	?	?			?	?	?	?																					
"Corrected Means."	?	?	?	?	57.2	42.5			52.9	49.3	44.2	47.0																					
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†† = 29.339
for Temp. (Col. 2) = 0.069..... -

"Corrected Mean" of Barometer at 9 P.M., minus the Correction†† = 29.322
for Temp. (Col. 4) = 0.085..... -

Mean at Station, corrected, and at 32°, = 29.331

Correction for Height, 220 feet, above Mean Sea-level, = 0.241

Mean, reduced to 32°, and Sea-level, = 29.572

Highest Reading, corrected for Index error, on the 21st, = 29.790

Lowest Do., Do., on the 15th, = 29.018

Difference, or Monthly Range, = 0.772

S.-R. THERMOMETER, (in shade, etc.), Highest in Month (corrected for Index errors), on the 25th, = 74.8

Lowest in Month, corrected for Index errors, on the 31st, = 52.8

Difference, or Monthly Range, = 22.0

"Corrected Mean" of all the Highest, (Col. 5), = 59.2

"Corrected Mean" of all the Lowest, (Col. 6), = 42.5

Difference, or Mean Daily Range, = 16.7

** Calculated Mean Temperature of Month, = 50.85

S.-R. THERMOMETER, Bulb, in Sun, Highest, (corrected, for Index errors), on the 25th, = 74.8

"Corrected Mean" of all the Highest, (Col. 5), = 59.2

Lowest at Night, corrected for Index errors, on the 31st, = 52.8

"Corrected Mean" of all the Lowest, (Col. 6), = 42.5

Difference of above Means or Range ("exposed"), = 16.7

HYGROMETER, Mean (corrected) A.M. and P.M. Reading of Dry Bulb, = 51.0

Mean (corrected) A.M. and P.M. Reading of Wet Bulb, = 48.1

†† Computed Temperature of Dew-point, = 45.1

†† Do. Elastic Force of Vapour, = 3.01

†† Do. Weight of Vapour in a Cubic Foot of Air, = 3.42

†† Relative Humidity, (Saturation = 100), = 80.6

RAIN fell on 14 Days; Amount in Inches, = 2.018

WIND.		SUMMARY.									
Direction.		N	NE	E	SE	S	SW	W	NW	Calm or Variable.	Mean Force.
9 A.M.		6	2	0	3	5	7	1	4	3	1.7
9 P.M.		4	2	1	5	3	8	1	1	6	.97
Mean.		5	2	0.5	4	4	7.5	1	2.5	4.5	1.11
		5	2	1	4	4	7	1	2	5	

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

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 2nd; 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)

James B. Smith

SCOTTISH METEOROLOGICAL SOCIETY.

Observations taken at Forres, County of Aberdeen, in Lat. 57° 16' N, Long. 2° 22' W, Distance from Sea 13 1/4 miles.Height of Cistern of the Barometer above Mean Sea-level 220 feet, above Ground 24 feet.During the MONTH of June 1865.

The Hours of Observation are of Greenwich Time.

ELECTRICITY.	Days of Month.	BAROMETER.				SELF-REGISTERING THERMOMETERS. Read daily, at 9 P.M.				HYGROMETER. No. 44 <i>Brayner</i>				WIND.				RAIN.		CLOUDS.				THERMOMETERS. under Ground.			SEA.	OZONE. 0—10.	GENERAL REMARKS. As to occurrence of Thunder, Lightning, Storms, Hail, Meteors, Remarkable Depression or Elevation of Barometer, Prevalent Diseases, etc. <i>Mention the hour at which Storms began and ended.</i>	Days of Month.										
		9 h. A.M.		9 h. P.M.		Protected, in Shade, 4 feet above Ground.		Exposed Black Bulbs.		9 h. A.M.		9 h. P.M.		9 h. A.M.		9 h. P.M.		No. of hours in which it fell.	Amount in inches.	9 A.M.		P.M.		9 h. A.M.																
		Barometer. No.	Attach- ed Ther- mometer	Barometer. No.	Attach- ed Ther- mometer	Max. No. 44 Therm.	Min. No. 44 Therm.	Max. in Sun's rays No.	Min. on Grass. No.	Dry bulb.	Wet bulb.	Dry bulb.	Wet bulb.	Direc- tion.	Force	Direc- tion.	Force			Readings of the H-Cup Anemometer. No.		Velocity, (0—6), and Direction.	Amount, (0—10), and Species.	Velocity, (0—6), and Direction.	Amount, (0—10), and Species.	No.					Inches.	No.	Inches.	No.	Inches.					
																				9 h. A.M.	9 h. P.M.															9 h. A.M.	9 h. P.M.	3	12	22
																				inches.	inches.															inches.	inches.	inches.	inches.	inches.
1	29.648	51	29.594	52 1/2	51.1	39.2			47.8	45.5	44.0	43.9	SE	2	SE	1 1/2			1.00	1.58	10 Cu	3 SE	0.00	fine	dull		6	4		1										
2	29.492	52	29.402	54	53.9	42.5			47.5	45.3	46.8	46.8	SE	1 1/2	SE	1			.090	1.58	10 Cu	1 SE	10 Cu	rough	rain		6	5		2										
3	29.370	55 1/2	29.550	61	62.9	45.2			49.9	49.3	53.3	52.0	SE	1 1/2	SE	1 1/2			.065	?	10 Cu	1 Cu	10 Cu	fine	fine		4	4		3										
4	29.712	59	29.689	63	64.2	43.2			59.5	54.8	56.0	53.9	S	1 1/2	SE	1 1/2			.000	1.5	7 Cu	?	10 Cu	do	do		4	4		4										
5	29.642	62	29.704	67	71.3	53.4			63.9	60.0	58.2	55.0	SE	1	0	0			.000	1.56	10 SE	?	9 Cu	fine	fine		4	2	A few drops rain in the morning.	5										
6	29.662	63 1/2	29.820	63	66.0	49.4			64.6	61.0	50.3	49.7	W	1	SE	1			.190	1 1/2	10 Cu	1 1/2 Cu	5 Cu	do	do		3	4		6										
7	29.912	59 1/2	29.896	64	68.3	43.4			58.1	53.6	53.2	52.2	W	1 1/2	SE	1 1/2			.000	1.2 Cu	2 Cu	0	0	do	do		4	4		7										
8	29.850	64	29.776	72	78.7	47.3			67.0	62.8	59.9	56.0	0	0	1.0 W	1 1/2			.000	1 1/2	10 Cu	1 1/2 Cu	2 Cu	do	do		1	3	A few drops rain in the morning.	8										
9	29.800	64	29.736	67	69.2	50.7			57.6	53.7	56.9	51.8	W	1 1/2	W	1 1/2			.000	1 Cu	1 1/2 Cu	1 1/2 Cu	10 Cu	do	fine		4	3		9										
10	29.608	59	29.596	53 1/2	61.3	46.5			58.8	52.5	47.7	45.2	W	2	W	4			.000	1 1/2 Cu	9 Cu	0	0	rough	rough		3	4	A few drops rain in the evening.	10										
11	29.802	54	29.400	55	54.9	40.5			48.5	45.0	39.1	39.2	W	3	W	5			.020	2 1/2 Cu	10 Cu	0	0	rain	fine		6	4		11										
12	29.934	55	29.920	62	61.9	34.8			52.1	48.2	53.0	53.2	W	1	W	1			.000	5	10 Cu	1 1/2 Cu	7 Cu	fine	do		2	2		12										
13	29.954	59	29.918	67 1/2	70.0	50.7			59.8	53.6	53.9	51.5	W	2	W	1			.000	2 Cu	2 Cu	0	0	do	do		4	4		13										
14	29.928	59	29.906	63	70.0	47.2			56.2	51.3	55.9	55.0	W	1 1/2	SE	1			.000	2 Cu	3 Cu	1 1/2 Cu	10 Cu	do	dull		5	4		14										
15	29.918	64	30.000	64	62.4	51.6			60.5	56.7	54.7	52.0	W	1	W	1 1/2			.000	1 1/2	10 Cu	1 1/2	10 Cu	do	fine		4	4		15										
16	30.050	60 1/2	30.034	70	69.2	46.0			53.0	54.7	55.4	53.0	W	1 1/2	W	5			.000	1 1/2	10 Cu	0	0	do	do		5	3		16										
17	30.008	62 1/2	29.922	70	73.6	48.7			62.0	56.2	53.1	56.2	W	1 1/2	0	0			.000	0	0	0	0	fine	fine		5	3		17										
18	29.920	60	29.920	64	68.4	49.2			56.3	53.0	55.2	52.7	W	2	W	1			.000	2 Cu	10 Cu	1 1/2 Cu	9 Cu	rough	cloudy		5	3		18										
19	29.902	62	29.808	72 1/2	75.4	48.7			61.4	56.9	53.3	57.2	W	1	0	0			.000	0	0	0	0	fine	fine		4	2		19										
20	29.850	63 1/2	29.896	64	61.5	44.3			57.3	51.4	57.1	50.8	SE	1	SE	1			.000	?	10 Cu	1 1/2 Cu	4 Cu	fine	fine		4	6		20										
21	29.912	62	29.872	62	63.7	47.5			53.0	55.6	57.0	50.9	S	1 1/2	SE	1 1/2			.000	1.5	9 Cu	0	0	fine	do		5	4		21										
22	29.770	62	29.722	78	80.2	44.2			68.7	61.3	62.9	61.1	S	1 1/2	W	1 1/2			.010	?	2 Cu	1 Cu	10 Cu	fine	rain		6	3 1/2		22										
23	29.535	69 1/2	29.534	65	67.4	51.3			63.0	61.2	52.5	49.7	SE	1 1/2	W	1 1/2			.185	1 1/2 Cu	10 Cu	1 1/2 Cu	3 Cu	fine	fine		4	4		23										
24	29.620	53 1/2	29.614	61	60.0	40.1			53.9	48.9	51.9	50.0	W	1 1/2	W	1			.000	1 1/2 Cu	7 Cu	1 1/2 Cu	10 Cu	do	do		4	3		24										
25	29.546	58	29.412	59	53.9	49.3			52.1	50.8	53.8	53.1	SE	1	W	1 1/2			.075	?	10 SE	1 1/2 Cu	10 Cu	dull	rain		4	4		25										
26	29.580	56	29.704	58	58.4	48.3			52.6	51.0	50.0	45.6	W	1 1/2	SE	1			.405	1 1/2 Cu	10 Cu	1 1/2 Cu	10 Cu	do	fine		6	4		26										
27	29.724	58 1/2	29.714	62	65.2	46.6			57.0	55.4	54.5	54.6	SE	1 1/2	SE	1 1/2			.000	?	10 SE	?	10 Cu	fine	do		3	3		27										
28	29.646	60 1/2	29.510	52	64.2	51.2			53.3	52.9	52.9	54.0	SE	1	SE	1			.000	1.58	10 SE	1.58	10 Cu	do	fine		?	6		28										
29	29.426	59 1/2	29.406	56 1/2	55.9	49.0			54.0	53.7	50.1	49.8	SE	1	SE	1			.010	1.58	10 Cu	1.58	10 Cu	dull	dull		5	5		29										
30	29.400	56 1/2	29.392	61	63.6	41.4			56.3	53.0	49.9	49.9	SE	1 1/2	W	1 1/2			.000	1.8	8 Cu	1 1/2	3 Cu	fine	fine		5	4		30										
31																															31									
Sums.		892.124	1787	891.876	1903 1/2	1943	6139.7			1713.6	1614.3	1576	1528.1	38 1/2	29 1/2				1.060	29	229 1/2	23	179					125 1/2												
Means.		29.737	59.6	29.729	63.4	65.0	46.5			57.1	53.8	53.2	51.6	1.25	.98				1.32	7.65	1.21	5.91					4.18	3.75												
+ Total Corrections for Instrumental Errors.		?	?	?	?	+ 2	+ 3			+ 3	- 1	+ 3	- 1																											
+ Corrections for Diurnal Range.		?	?	?	?	?	?			?	?	?	?																											
"Corrected Means."		?	?	?	?	65.2	46.8			57.4	53.7	53.5	51.5																											
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								

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

TABLE FOR ESTIMATING FORCE OF WIND.					
Estimated Force, 0—6.	Common Designation.	Estimated Force, 0—5.	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.	" "	ms.	" "
ci-cu.	" "	n.	" "
ci-s.	" "	r.	" "
cu.	" "	h. r.	" "
cu-s.	" "	c. h. r.	" "
d.	" "	s.	" "
f.	" "	sc.	" "
fr.	" "	sl.	" "
h-fr.	" "	sn.	" "
h.	" "	so. ha.	" "
h. d.	" "	sq.	" "
ll.	" "	squ.	" "
l.	" "	t.	" "
li. cl.	" "	t-s.	" "
li. sh.	" "	w.	" "
lu. co.	" "	g.	" "
lu. ha.	" "		" "

TABLE FOR ESTIMATING FORCE OF WIND.

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

BAROMETER, "Corrected Mean" at 9 A.M., minus the Correction++ = 29.655
for Temp. (Col. 2), = 29.737..... - .082....."Corrected Mean" of Barometer at 9 P.M., minus the Correction++ = 29.636
for Temp. (Col. 4), = 29.729..... - .093.....Mean at Station, corrected, and at 32°, = 29.646
Correction for Height, 220 feet, above Mean Sea-level, = .241Mean, reduced to 32°, and Sea-level, = 29.887
Highest Reading, corrected for Index errors on the 16 th, = 30.050Lowest Do., Do., on the 3 th, = 29.370
Difference, or Monthly Range, = .680

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

S.-R. THERMOMETER, (in shade, etc.), Highest in Month (corrected for Index errors), on the 22 th, = 80.4Lowest in Month, corrected for Index errors, on the 12 th, = 55.1Difference, or Monthly Range, = 45.3"Corrected Mean" of all the Highest, (Col. 5), = 65.2"Corrected Mean" of all the Lowest, (Col. 6), = 46.8Difference, or Mean Daily Range, = 18.4** Calculated Mean Temperature of Month, = 56.0S.-R. THERMOMETER, Black Bulb, in Sun, Highest, (corrected for Index Errors), on the th, = ?"Corrected Mean," (Col. 7), of Black Bulb, Max. in Sun, = ?Lowest at Night, Black Bulb, (corrected for Index errors), on the th, = ?"Corrected Mean," (Col. 8), of Black Bulb Min. on grass, = ?Difference of above Means or Range ("exposed"), = ?HYGROMETER, Mean (corrected) A.M. and P.M. Reading of Dry Bulb, = 55.4Mean (corrected) A.M. and P.M. Reading of Wet Bulb, = 52.6†† Computed Temperature of Dew-point, = 49.9

†† Do. Elastic Force of V

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 incommensurate, may arise from dissimilarity in the position or shelter of instruments, or from 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 with, 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 *adjusting or compensating* 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-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 the aid of a screw acting on the bottom, the surface of the contained mercury can be adjusted to the *zero-point* of the fixed scale; their coincidences 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 screws, to *form one straight line* with the exact height from which the surface of the mercury is then at the exact height from which the scale is graduated. In taking an observation, this *preliminary* setting must be made with scrupulous accuracy; as a slight error here will vitiate the readings from the *venier*.

When a Barometer having adjustable surfaces has to be removed from its fastenings the ivory peg must be screwed so as to form a tight plug to the cistern. Then *seize* up the mercury to within 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 get 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 black within, and fixed 4 feet above grass in an exposed position, free from merely local influences. The laths forming the sides and doors of the Boxes are arranged so as at once to "protect" the Thermometers, and to allow a complete ventilation of the interior. The instruments are suspended on cross-laths, in the centre of the Box, and face the door opening to the north. To accommodate a duplicate set of instruments, which is most desirable, doors are also made to open to the south. These Boxes may be had at the Society's Office.

Self-registering Thermometers.—Professor Phillips's, and Negretti and 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 in the upper lobe, and must be dislodged from thence by heating that part over a lamp; the alcohol will evaporate and again condense in contact with the body of the liquid. This instrument must be hung perfectly horizontal; the bulb end should incline slightly downwards, rather than the other.

nonenclature 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 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 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 2, 3, 4, 5, 6, 7, 8, 9, 10, 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.

Shading.—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 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. **Remarks.**—Mention whether Schönbain's or Moffat's papers are used—Moffat's are preferred. 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 S.W., 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 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 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 margin. **Observations** in connection with the periodic return of the seasons, possess not only great scientific value, but are of considerable interest to the Agriculturist. The Council would direct the special attention of Observers to the registration of such phenomena; that the published Summaries may fairly represent the whole of Scotland. Observations ought to be confined to individual trees and shrubs; to particular species of birds; and, in the case of crops, to specified sorts reared from year to year, on a selected piece of ground or farm.

The Council recommend that *term-day* observations be taken; viz., on the 21st days of March, June, September, and December. For these hourly observations separate schedules will be furnished to observers. Full directions for the use of the instruments mentioned above have been printed, and may be had along with them from the makers.

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

(By Order.) A. B.

EDINBURGH, 9th December 1865.

OBSERVATIONS IN CONNECTION WITH THE PERIODICAL RETURN OF THE SEASONS.

FOREST TREES.	GRASSES.	Scrub or Planting.	Scrub or Above Ground.	Scrub or In Ear.	Scrub or Harvest.
Alder,	Barley,	Bare or Bigger,	Cats,	Wheat,	Beans,
Aspen,	Barley,	Bare or Bigger,	Cats,	Wheat,	Beans,
Beech,	Barley,	Bare or Bigger,	Cats,	Wheat,	Beans,
Birch,	Barley,	Bare or Bigger,	Cats,	Wheat,	Beans,
Elm,	Barley,	Bare or Bigger,	Cats,	Wheat,	Beans,
Larch,	Barley,	Bare or Bigger,	Cats,	Wheat,	Beans,
Timber,	Barley,	Bare or Bigger,	Cats,	Wheat,	Beans,
Oak,	Barley,	Bare or Bigger,	Cats,	Wheat,	Beans,
Scrub or Planting,	Barley,	Bare or Bigger,	Cats,	Wheat,	Beans,

SHRUBS, ETC.	FRUIT.	First in Blossom.	First in Fruit.	First in Harvest.	First in General.
Barberry,	Apple,	Cuckoo,	Curlew,	House-Swallow,	Lapwing,
Broom,	Cherry,	Gooseberry,	Holly,	Laburnum,	Lilac,
Mezereum,	Plum,	Swan,	Rail or Corn Crane,	Other Birds, naming them,	Whin,
Rhododendron,	Red Flowering Currant,	Moisture,	Moisture,	Moisture,	Moisture,

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 Immerup, County of Aberdeen, in Lat. 57° 16' N, Long. 2° 22' W, Distance from Sea 13 1/4 miles.

Height of Cistern of the Barometer above Mean Sea-level 220 feet, above Ground 24 feet.

During the MONTH of July 1865.

do of Anemometer " " " 200 The Hours of Observation are of Greenwich Time.

ELECTRICITY.	Days of Month.	BAROMETER.				SELF-REGISTERING THERMOMETERS. Read daily, at 9 P.M.				HYGROMETER. No. 99 <i>Cydon</i>				WIND.				RAIN.		CLOUDS.				SUNSHINE. Hours.	THERMOMETERS. under Ground.			SEA. Temperature at 1 fathom, and Density.	OZONE. 0—10. 9 A.M. 9 P.M.	GENERAL REMARKS. As to occurrence of Thunder, Lightning, Storms, Hail, Meteors, Remarkable Depression or Elevation of Barometer, Prevalent Diseases, etc. <i>Mention the hour at which Storms began and ended.</i>	Days of Month.							
		9 h. A.M.		9 h. P.M.		Protected, in Shade, 4 feet above Ground.		Exposed Black Bulbs.		9 h. A.M.		9 h. P.M.		9 h. A.M.		9 h. P.M.		Readings of the H-Cup Anemometer.		No. of hours in which it fell.	Amount in inches.	9 A.M.			4 P.M.		9 h. A.M.											
		Barometer.	Attach- ed Ther- mometer	Barometer.	Attach- ed Ther- mometer	Max. No. 89.	Min. No. 94.	Max. in Sun's rays.	Min. on Grass.	Dry bulb.	Wet bulb.	Dry bulb.	Wet bulb.	Direction.	Force.	Direction.	Force.	No.	9 h. A.M.			9 h. P.M.	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.				
		* No.		No.				No.																														
		inches.		inches.																																		
1					62.4	44.3			52.1	49.1	48.9	47.9	SW	1 1/2	N	N						1.00	1.00	0	0						1							
2					65.8	35.3			56.6	53.8	53.7	53.0	SE	1/2	SE	1			0.30	1.50	rain	1.00	7	1							2							
3					78.1	45.6			64.2	61.2	61.6	57.0	SE	1/2	N	N						?	3	1	0	0						3						
4					71.8	45.0			67.2	61.3	59.0	57.3	SE	1/2	SE	1						1.50	7	1	?	10						4						
5					74.7	54.7			65.6	61.2	59.7	58.4	SW	1/2	N	N			1.65	0	0	0	0								5							
6					74.3	46.0			68.2	63.1	58.6	57.5	SE	1/2	SE	1/2						1.50	7	0	1.50	2						6						
7					59.3	52.7			57.2	57.6	54.4	54.8	N	N	SW	1 1/2			1.65	?	10	1	10	1	10							7						
8					55.3	48.7			51.1	50.2	51.3	50.5	SW	1/2	SW	1			2.95	1	10	1	10	1	10							8						
9					56.5	47.2			54.0	51.3	49.7	49.5	N	1	0	0			0.90	1	10		?	10								9						
10					56.4	47.3			54.0	52.2	51.0	50.7	N	N	SE	1			2.20	?	10		?	10								10						
11					57.9	45.6			53.0	49.3	50.0	50.2	N	1 1/2	N	1 1/2			0.25	1	10	1	10									11						
12					61.8	43.7			51.7	48.2	52.5	52.1	SW	1 1/2	SE	1				1.00	10		N	10								12						
13					62.2	47.5			55.0	54.0	56.7	53.2	SE	2	SW	1/2			0.50	1	10	1	10	1	10							13						
14					62.1	50.9			56.8	55.1	60.0	56.0	SW	1 1/2	SW	1				1	1	10	1	10	1	10							14					
15					61.1	52.8			60.1	57.8	62.3	60.0	SW	3	SW	4				2.30	10	10	4.50	1	10								15					
16					66.0	55.5			65.3	60.5	56.1	53.2	SW	1 1/2	SW	1/2			0.60	N	8	10	1.50	4	10								16					
17					70.2	46.3			62.3	55.8	58.8	57.2	SW	1	SW	1/2				N	1	10	N	8	10								17					
18					66.9	49.1			58.9	56.3	57.6	50.5	SE	1/2	SE	1/2				1	1	10	1	10	1	10							18					
19					60.6	48.0			53.8	54.0	54.5	53.0	SW	1	0	1/2			2.18	1	10	1	10	?	10								19					
20					66.7	48.5			64.6	59.2	57.0	56.2	SW	1	S	1			0.07	1/2	5	1	10	1	10								20					
21					68.9	47.5			64.0	60.3	56.5	56.5	S	1 1/2	S	1				1/2	5	2	0	0									21					
22					68.1	45.4			61.1	59.9	55.2	55.0	SW	1/2	SE	1/2				1/2	5	3	?	9									22					
23					72.0	42.9			62.9	60.4	62.0	62.2	N	1	0	0				0	0	1/2	10										23					
24					71.5	50.0			67.4	63.1	57.0	57.3	S	1	S	1/2				1	1	10	?	8	10								24					
25					75.1	47.8			67.0	63.4	63.1	62.3	SW	1/2	S	1/2				1	1	10	1.5	6	10								25					
26					70.1	56.4			64.9	61.1	58.2	58.1	N	1	S	1/2				?	6	1	10	1	10								26					
27					68.1	55.3			63.4	61.5	56.3	53.8	SW	1 1/2	N	1 1/2			0.20	1	10	5	0	0									27					
28					63.1	51.7			56.1	53.3	54.6	55.0	N	1 1/2	N	1				1/2	10	1	10	1	10								28					
29					60.1	51.8			54.6	53.0	52.0	50.2	0	0	SW	1			0.10	?	10	1	10	1	10								29					
30					55.3	45.3			51.9	49.6	46.3	46.0	SW	2	SW	1/2			0.70	2	10	1	10	1	10								30					
31					58.2	40.4			52.7	49.8	47.9	47.4	SW	1 1/2	N	N				1	1	10	5	?	10								31					
Sums.					2020.6	1490.3			1837.7	1748.6	1716.5	1686.6	36		24				2.985	25	21.5	18 1/2	18.5															
Means.					65.2	48.1			59.3	56.4	55.4	54.4	1.16		.77							6.94	5.97															
Total Corrections for Instrumental Errors.					+ .2	+ .3			+ .3	- .1	+ .3	- .1																										
Corrections for Diurnal Range.					?	?			?	?	?	?																										
Corrected Means.					65.4	48.4			59.6	56.3	55.7	54.3																										
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							

NOTATION USED IN GENERAL REMARKS.

a.	denotes aurora.	m.	denotes meteor.
ci.	" "	ms.	" "
ci-cu.	" "	n.	" "
ci-s.	" "	r.	" "
cu.	" "	h. r.	" "
cu-s.	" "	c. h. r.	" "
d.	" "	s.	" "
f.	" "	sc.	" "
fr.	" "	sl.	" "
h.-fr.	" "	sn.	" "
h.	" "	so. ha.	" "
h. d.	" "	sq.	" "
hl.	" "	sq.	" "
l.	" "	sq.	" "
l. cl.	" "	t.	" "
l. sh.	" "	t-s.	" "
lu. co.	" "	w.	" "
lu. ha.	" "	g.	" "

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), =
 "Corrected Mean" of Barometer at 9 P.M., minus the Correction++ for Temp. (Col. 4), =
 Mean at Station, corrected, and at 32°,
 Correction for Height, feet, above Mean Sea-level,
 Mean, reduced to 32°, and Sea-level,
 Highest Reading, corrected for Index error, on the th,
 Lowest Do., Do., on the th,
 Difference, or Monthly Range,
 * Each instrument tested at the Office in Edinburgh bears the stamp "S.M.S." and a number to be entered in the Heading; or the Number and Initials of the Maker may be here given.
 + Embracing corrections for both capillarity and Index Errors.
 + The Diurnal Range for Scotland is as yet unknown.
 + Practically, though not absolutely, a minus correction.
 + These "Hygrometrical Deductions" are calculated from Glaisher's Hygrometrical Tables, Second Edition only.
 + While the Diurnal Range is unknown, the Arithmetical Mean of Col. 5 and 6 will be entered as the "Calculated Mean Temperature."
 + Any Observations not taken under the conditions specified in the Directions on the other side, or noted at the Top of each column, must be marked as such by the Observer, in each Schedule. See Over.

S.-R. THERMOMETER, (in shade, etc.), Highest in Month (corrected for Index errors), on the 3rd,
 Lowest in Month, corrected for Index errors, on the 2nd,
 Difference, or Monthly Range,
 "Corrected Mean" of all the Highest, (Col. 5),
 "Corrected Mean" of all the Lowest, (Col. 6),
 Difference, or Mean Daily Range,
 ** Calculated Mean Temperature of Month,
 S.-R. THERMOMETER, Black Bulb, in Sun, Highest, (corrected, for Index Errors), on the th,
 "Corrected Mean," (Col. 7), of Black Bulb, Max. in Sun,
 Lowest at Night, Black Bulb, (corrected for Index errors), on the th,
 "Corrected Mean," (Col. 8), of Black Bulb Min. on grass,
 Difference of above Means or Range ("exposed"),
 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 2nd; 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.

HYGROMETER, Mean (corrected) A.M. and P.M. Reading of Dry Bulb,
 Mean (corrected) A.M. and P.M. Reading of Wet Bulb,
 II Computed Temperature of Dew-point,
 II Do. Elastic Force of Vapour,
 II Do. Weight of Vapour in a Cubic Foot of Air,
 II Relative Humidity, (Saturation = 100),
 RAIN fell on 14 Days; Amount in Inches,
 WIND, SUMMARY.
 Direction. N NE E SE S SW W NW Calm or Variable. Mean Force. Mean Velocity in miles per day.
 A.M. 4 1 0 6 2 8 1 6 3 1.16
 P.M. 1 1 1 7 5 4 2 4 6 .77
 Mean. 2 1/2 1 1/2 6 1/2 3 1/2 6 1/2 4 1/2 .965
 2 1 1 6 4 6 2 5 4

Observations made and Return verified by

(Signed) Jas. Priest

In the "Journal" for Quarter ending 31st March 1865, the Max. Temp. (in shade) at Immerup for July is given 47° in place of 48° and the "Mean of all the lowest" for March 8° in place of 30° 87. 220 ft is the height of my Barometer above the sea, but the Thermometers are only 200 ft.

INSTRUCTIONS

14

The above remarks apply equally to the Thermometers for

Verification of Thermometers.—No instrument ought to be used for the purpose of determining the heat of the Sun's heat to affect the alcohol by distillation.

The *Hygrometer* consists of two Thermometers usually, but

cotton, which also supplies it with water. It must be seen to by

Reading of the Thermometer.—Great care must be taken to

Hour of Observing Temperature.—The Hygrometer is read at

Careful observations ought to be made on the chances in the

Rain-gauges—Many causes conspire to produce anomalies

Snow-falls may, for convenience, be registered in the rain

Clouds.—Convenient abbreviations for Luke Howard's

nomenclature of clouds will be found on the other side. The

Observations of the clouds are made at 9 A.M. and at sunset.

and Direction," $\frac{1}{2} \frac{W}{W}$, (for example,) will indicate that the

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

Temperature of the Sea — A knowledge of the temperature of

Ozone.—Mention whether Schönheim's or Moffat's papers are

Remarks—The "Remarks" column is too narrow but in-

By the use of abbreviations, the state of the weather at 9 A.M.

The Council recommends that *term-day* observations be taken:

Full directions for the use of the instruments mentioned

BEFORE SIGNATURE, WRITE IN BLOCK CAPITALS: **NAME** _____

Printed 9th December 1854

OBJECTION: THE CONNECTION WITH THE EPISTEMIC NOTION OF THE SEASONS.

[illegible]

SHRUBS, ETC.		FRUITS.		MIGRATORY BIRDS.	
Barberry,	Apple,	First in Blossom.	First in generally.	Cuckoo,	First Arrival.
Houttree or Elder,	Black Currant,			Curtlew,	Departure.
Broom,	Cherry,			House-Swallow,	
Hazel,	Gean,			Lapwing,	
Hawthorn,	Gooseberry,			Plover,	
Holly,	Peach,			Sand-Martin,	
Laburnum,	Pear,			Starling,	
Lilac,	Plum,			Swan,	
Alexandria,	Strawberry,			Rail or Corn Crake,	
Red Flowering Currant,				Other birds, naming them—	
Mountain Ash or Rowan,					
Rhododendron Ponticum,					
Whin,					

Typhoid, Typhus, etc., whether plentiful, or in perfection; and the Agricultural condition of the district generally.

BOOK POST

EDINBURGH

10 St. Andrew's Square.

Secretary of the Meteorological Society of Scotland

M. ALEXANDER BUCHAN

To

Inventory
Leaf 1865-

SCOTTISH METEOROLOGICAL SOCIETY.

Observations taken at Inverness, County of Aberdeen, in Lat. 57°41'N, Long. 2°22'W, Distance from Sea 13 1/4 miles.

Height of Cistern of the Barometer above Mean Sea-level 220 feet, above Ground 24 feet.

During the MONTH of August 1865.

The Hours of Observation are of Greenwich Time.

ELECTRICITY.	Days of Month.	BAROMETER.				SELF-REGISTERING THERMOMETERS. Read daily, at 9 P.M.				HYGROMETER. No. 44. <i>Asym</i>				WIND.				RAIN.		CLOUDS.				THERMOMETERS. under Ground.			SEA.	OZONE. 0-10.	GENERAL REMARKS. As to occurrence of Thunder, Lightning, Storms, Hail, Meteors, Remarkable Depression or Elevation of Barometer, Prevalent Diseases, etc. <i>Mention the hour at which Storms began and ended.</i>	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. in Sun's rays No. _____	Min. on Grass. No. _____	Dry bulb.	Wet bulb.	Dry bulb.	Wet bulb.	Direction.	Force.	Direction.	Force.	No. of hours in which it fell.	Amount in inches.	Velocity, (0-6), and Direction.	Amount, (0-10), and Species.	Velocity, (0-6), and Direction.	Amount, (0-10), and Species.	No. _____	No. _____	No. _____																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																											
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BAROMETER, "corrected Mean" at 9 A.M., minus the Correction ++ for Temp. (Col. 2), = 30.0
"Corrected Mean" of Barometer at 9 P.M., minus the Correction ++ for Temp. (Col. 4), = 30.0
Mean at Station, corrected, and at 32°, = 30.0
Correction for Height, feet, above Mean Sea-level, = 220
Mean, reduced to 32°, and Sea-level, = 28.0
Highest Reading, corrected for Index error, on the 1th, = 30.4
Lowest Do., Do., on the 31th, = 29.6
Difference, or Monthly Range, = 0.8

S.-R. THERMOMETER, (in shade, etc.), Highest in Month (corrected for Index errors), on the 27th, = 74.4
Lowest in Month, corrected for Index errors, on the 4th, = 55.8
Difference, or Monthly Range, = 18.6
"Corrected Mean" of all the Highest, (Col. 5), = 62.2
"Corrected Mean" of all the Lowest, (Col. 6), = 46.9
Difference, or Mean Daily Range, = 15.3
** Calculated Mean Temperature of Month, = 57.5
S.-R. THERMOMETER, Black Bulb, in Sun, Highest, (corrected, for Index Errors), on the 1th, = 74.4
"Corrected Mean," (Col. 7), of Black Bulb, Max. in Sun, = 62.2
Lowest at Night, Black Bulb, (corrected for Index errors), on the 31th, = 46.9
"Corrected Mean," (Col. 8), of Black Bulb Min. on grass, = 46.9
Difference of above Means or Range ("exposed"), = 15.3

HYGROMETER, Mean (corrected) A.M. and P.M. Reading of Dry Bulb, = 54.7
Mean (corrected) A.M. and P.M. Reading of Wet Bulb, = 53.5
†† Computed Temperature of Dew-point, = 52.3
†† Do. Elastic Force of Vapour, = 39.4
†† Do. Weight of Vapour in a Cubic Foot of Air, = 4.41
†† Relative Humidity, (Saturation = 100), = 91.6
RAIN fell on 24 Days; Amount in Inches, = 3.125

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	0	1	8	1	4	0	6	6	964		
P.M.	6	4	0	6	2	2	1	4	9	607		
Mean.	1	2	1	7	2	3	1	5	8	785		

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 2nd; 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)

Jas. Baird

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 very considerable as to Returns from any two Stations, so very different dissimilarity 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 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 *Anæroids*, though admirably adapted, as the latter certainly are, to indicate variations of atmospheric pressure, are not well fitted for scientific purposes. No 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-tubes* 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 the aid of a screw acting on the bottom, the surface of the contained mercury can be adjusted to the *zero-point* of the fixed scale; their coincidence being indicated by a little ivory float, whose stem passes freely through the lid and case of the cistern. When 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 *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 *sew up* the mercury to within a quarter of an inch of the top of the tube, and take down the instrument; it may then be carried with the cistern uppermost. Before suspending the Barometer for use, it must be ascertained whether the space above the mercury in the tube is a complete vacuum; this is the case when, on inclining the instrument so that the mercury strikes the top of the tube, a *sharp tap* is produced. If this is prevented by air it may be removed to the cistern, and got rid of, by inverting the Barometer (care being taken to prevent the loss of mercury by tightening the ivory peg), and gently tapping it; and if this plan fails, the instrument must be repaired.

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

In taking an *Observation*, the attached Thermometer is first noted; the tube must then be gently tapped and the cistern-adjustment carefully made. By raising and lowering the eye, it must be brought into the plane of the back and front of the index—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 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 to open to "protect" the Thermometers, and to allow a complete ventilation of the interior. The instruments are suspended on cross-laths, in the centre of the Box, and face the door opening to the north. To accommodate a duplicate set of instruments, which is most desirable, doors are also made to open to the south. These Boxes may be had at the Society's Office.

Self-registering Thermometers.—Professor Phillips's, and Negretti and 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 the instrument is dislodged from the palm of the hand, it will be found that the spirit disals by high temperature, it will be found in the upper lobe, and must be dislodged from thence by heating that part over a lamp; the alcohol will evaporate and again condense in contact with the body of the liquid. This instrument must be hung perfectly horizontal; the bulb and should incline slightly downwards, rather than the other.

OBSERVATIONS.

non-enclosure 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," 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 2, *at* 4, *at* 8, 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 *emulo-stratus* kind.

Shade.—The number of hours in which objects in the sun's rays cast shadows, should be entered in the proper column.

Underground Thermometers.—As the germination and health of crops and plants greatly depend on the temperature of the soil,—its amount and constancy; the Council recommend that observations in this interesting department be made at 9 A.M., by thermometers placed in the earth, their bulbs being sunk to 3, 12, and 22 inches, and the stems above ground protected from the sun's rays, and fitted with sloping tin collars, to prevent rain-water being conveyed to the bulbs by the stems or wooden frames. Mention must be made of the geological formation and agricultural condition of the soil in which these thermometers are placed.

Temperature of the Sea.—A knowledge of the temperature of the sea is not only in itself, but in its relations to that of our island, a very important branch of Meteorology. The Council, therefore, recommend that the temperature of the sea be carefully taken by a properly constructed apparatus, from the ends of piers and rocks round the coast, where it is not influenced by that of river water. At or near the time of high water, on the 24th, 16th, 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 Schönbain's or Mollat's papers are used.—Mollat's are preferred. 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 $\frac{3}{4}$ S.W., as an ozone entry in the schedule, will indicate that the ozone paper is tinted as $\frac{3}{4}$ on the scale, that the wind is from the N.W., and that its force on the scale 0-5 is 4; i.e., that it is *blowing fresh*.

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

Remarks.—The "Remarks" column is too narrow, but unavoidably so. Some of the most valuable observations that can be taken are those for which no rules can be given nor hours assigned. The use of contractions ought therefore to be taken every advantage of, and a list of such as are recognised and in use at Greenwich and Southampton, are given at the foot of the column. Besides special and extraordinary observations, great prominence ought to be given in this column to prevalent diseases, differences in character, colour, velocity, and direction between the lower and upper strata of clouds, the colour of the sky, etc. Remarks ought to be made on the occurrence of 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 either 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 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 *term-day* observations be taken;—viz., on the 21st days of March, June, September, and December. For these hourly observations separate schedules will be furnished to observers.

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

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

(By Order,) A. B.

En passant, 4th December 1863.

OBSERVATIONS IN CONNECTION WITH THE PERIODICAL RETURN OF THE SEASONS.

FOREST TREES.	FRUITS.	MIGRATORY BIRDS.	First Departure.
In flower.	First in blossom.	First in plumage.	First in plumage.
Alder,	Apple,	Chickadee,	Curlew,
Beech,	Broom,	House-Sparrow,	Lapwing,
Birch,	Cherry,	House-Sparrow,	Plow,
Elm,	Gooseberry,	Starling,	Swallow,
Larch,	Holly,	Sand-Martin,	Swallow,
Lincoln,	Laburnum,	Swallow,	Swallow,
Oak,	Mountain Ash or Rowan,	Swallow,	Swallow,
Sycamore or Plane,	Red-flowering Currant,	Swallow,	Swallow,

SHRUBS, ETC.	FRUITS.	MIGRATORY BIRDS.	First Departure.
First in blossom.	First in blossom.	First in plumage.	First in plumage.
Barberry,	Apple,	Chickadee,	Curlew,
Bortree or Elder,	Black Currant,	House-Sparrow,	Lapwing,
Hazel,	Cherry,	House-Sparrow,	Plow,
Hawthorn,	Gooseberry,	Starling,	Swallow,
Holly,	Holly,	Sand-Martin,	Swallow,
Laburnum,	Laburnum,	Swallow,	Swallow,
Mountain Ash or Rowan,	Mountain Ash or Rowan,	Swallow,	Swallow,
Red-flowering Currant,	Red-flowering Currant,	Swallow,	Swallow,
Rhododendron Ponticum,	Rhododendron Ponticum,	Swallow,	Swallow,
Whin,	Whin,	Swallow,	Swallow,

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 zootic diseases prevail among Cattle; and the Agricultural condition of the district generally.

Mr ALEXANDER BUCHAN,

Secretary of the Meteorological Society of Scotland,

10, St Andrew Square,

EDINBURGH.

BOOK-POST.

To

Inverury
August 1865