

1873

S Y M O N S ' S  
M O N T H L Y  
M E T E O R O L O G I C A L M A G A Z I N E .

LXXXIX.]

JUNE, 1873.

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THE LEIPZIG CONFERENCE.

*(Continued from page 58.)*

21. *In what manner and for what intervals are the normal values for the individual Meteorological elements to be deduced?*

(This and all the following questions were referred to a Committee consisting of MM. Bruhns, Jelinek, and Wild, who will be hereinafter referred to as the Committee).

SR. F. DA SILVEIRA (W) From the longest possible series.

M. CARL FRITSCH (W) Five or ten years.

THE BORDEAUX MEETING (W) Great care must be taken; the duration of records at different stations is very variable, and embraces periods differing in character; the introduction of years into one term which are not in another appears to us fallacious.

THE COMMITTEE recommended periods of 5 years, or multiples thereof.

M. VON OETTINGEN proposed the term lustral as descriptive of the five-year mean.

These proposals were adopted.

22. *Is it desirable and possible to publish the Meteorological Observations of a limited number of stations in each Country in a uniform manner, and within a reasonably short time after the Observations have been made?*

SR. F. DA SILVEIRA (W) Doubtless, but strictly uniform.

M. CARL FRITSCH (W) Possible, but not desirable apart from special objects.

CAPT. HOFFMEYER (W) Very important and desirable.

DR. MOHN (W) Yes.

DR. WOLF (W) Uniformity of publication cannot be secured; the conference should fix the minimum amount of information which is worthy of publication.

THE BORDEAUX MEETING (W) Yes, publications of uniform size, giving identical data, from stations always grouped in the same order.

THE COMMITTEE recommended uniform publications of observations made thrice daily.

After discussion, in which general approval of the proposal was expressed, the Committee were requested to prepare printed specimens for the Vienna meeting.

23. *How is the Exchange of the Meteorological Publications of different Institutions and different Countries to be carried out most speedily, safely, and simply?*

SR. F. DA SILVEIRA (W) By *free* transmission by post, the cost is at present restrictive. It should be authorized by an international convention, and there should be three deliveries per month.

M. CARL FRITSCH (W) Most simply and safely, if not most cheaply by post.

DR. MOHN (W) Monthly by book post.

The BORDEAUX MEETING (W) In France all such publications go post free, and if the "frank" stops at the frontiers, it is only because other States do not recognize it.

The COMMITTEE recommended for moderate sized parcels book post, for larger ones increased facilities should be rendered through the consulates.

M. BRUHNS recommended that existing institutions, such as the Smithsonian, should be utilized as far as possible.

24. *Is it desirable that in each country there should be established one or more central Institutions for the direction, collection, and publication of the Meteorological Observations?*

SR. F. DA SILVEIRA (W) Yes, and if possible one great international one to summarize their results.

M. CARL FRITSCH (W) Yes; more than one in each country, but it is above all things necessary to have men fit to take charge of such establishments.

DR. MOHN (W) Yes; they already exist in most European countries.

The BORDEAUX MEETING (W) Yes. We already have such an office in France, possessing merely a moral influence over its correspondents, furthering their work, giving them greater homogeneity and making them generally known.

The COMMITTEE recommended that there should be only one such Central Government Office in each country, but that Marine Meteorology should in all cases be kept distinct, and placed under a separate officer.

MR. BUCHAN said the Scottish Meteorological Society could not agree to there being only one Central office for Great Britain. The large volunteer staff of observers would not agree to be placed under government control.

MR. SCOTT pointed out that there were already several separate organizations in this country.

The CONFERENCE, by 14 votes against 6, decided that "It is desirable that in each country, one, or in case of necessity, several, Central Offices should be established, and that those for Sea and Land Observations should be separate."

25. *Does the interchange of Weather Telegrams appear so useful that it should receive a fuller development and a firmer organization ?*

SR. F. DA SILVEIRA (W) Yes, and special provision must be made to secure promptitude of transmission for the telegrams.

M. CARL FRITSCH (W) Judging from past experience at inland stations, the extension of the system seems undesirable.

CAPT. HOFFMEYER (W) Yes, and efforts should be made to secure better stations, firmer international organization and increased promptitude of transmission.

DR. MOHN (W) Yes, especially for storm warnings.

The BORDEAUX MEETING (W) Yes, but there must be greater celerity of transmission.

The COMMITTEE reported that the present system should be further developed. (Although not included in the programme, a sub-committee consisting of MM. Buys Ballot, Buchan, von Freeden, Müller, Neumayer, and Scott, was appointed for the consideration of Marine Meteorology; they also discussed the question of Weather Telegraphy and nominated a committee to collect evidence upon the subject (see p. 72,) and this nomination was at this stage of the proceedings notified to the Congress.)

MR. SCOTT (T) A central office for Weather Telegraphy should be established in every country. The Director in each country should incorporate in its bulletin, and in ordering storm signals should consider, the observations made at some stations in neighbouring countries, but he should not be expected to supply detailed information of the weather except upon his own coast.

M. PRESTEL (T) A certain set of stations should be selected, and the telegrams from each should be sent to every other.

MR. SCOTT (T) M. Prestel's proposal impracticable, and would break down through excessive wordiness.

M. VON OETTINGEN (T) It was to be regretted that Germany took so slight a part in the system. He thought the transmission of deviations from normal values more important than that of absolute readings.

M. VON FREEDEN (T) It was often impossible to obtain the necessary normal values.

Eventually the subject was referred to the Marine Sub-Committee for report.

26. *What regulations should be adopted in order to carry into effect the decisions and the objects of the Meteorological Congress ?*

M. CARL FRITSCH (W) Directors of all Central Offices should be requested to carry out the resolutions.

The BORDEAUX MEETING (W) The Vienna meeting should have an official standing, the representatives being nominated by the various governments, so as to ensure full weight being attached to their recommendations.

The COMMITTEE recommended that a full report of the proceedings

at Leipzig be drawn up, and that a permanent committee be appointed to prepare for the meeting in 1873.

M. BRUHNS stated the reasons for selecting Vienna, which was unanimously chosen.

M. BUYS BALLOT proposed MM. Wild, Jelinek, and Bruhns for the permanent Committee, and they were unanimously elected.

M. VON OETTINGEN proposed to establish a special organ for the publication of preliminary matter.

M. WILD (T) There would not be sufficient to render such a course necessary, besides which, it would be too irregular in date, and proposed that all such papers should be printed in the *Zeitschrift*.

M. JELINEK concurred, and the proposal was adopted.

#### MARINE SUB-COMMITTEE.

As before mentioned (although not in the programme) a sub-committee was nominated to consider the subject of marine meteorology ; it consisted of MM. Buys Ballot, Buchan, von Freeden, Müller, Neumayer, and Scott.

The following is an epitome of its decisions :—Central offices for marine meteorology should be established in all countries wherein they do not at present exist. Uniformity of instruments and modes of observation is desirable, but not so necessary as on land, and will be best attained by mutual agreement among the directors. Co-operation of the navies is most important, in order to secure completeness in all parts. Results must be discussed and utilized uniformly. The repetition of work [by different establishments] over definite regions must be declared indefensible.

The three following paragraphs do not seem quite clearly expressed either in the German or English reports, but we believe the following is nearly the true version :—Some proposal having been made for the gratuitous interchange between Directors of MS. observations, Mr. Scott said that the Meteorological Committee had resolved to charge for copies of any scientific documents ; M. Buys Ballot remarked that he, on the contrary, had never charged for such copying, and the proposal was unanimously agreed to. M. von Freeden however remarked that hitherto the matter had been arranged by mutual agreement, and that pressure could hardly be exerted. The decision of this sub-committee respecting weather telegraphy has been previously cited.

With the reception of this report of the sub-committee, the business of the Conference terminated.

A SEQUEL TO THE SUGGESTIONS ON A UNIFORM  
SYSTEM OF METEOROLOGICAL OBSERVATIONS,  
BY DR. BUYS BALLOT.

[We have already drawn the attention of our readers to the above quoted work, and made arrangements whereby they can easily obtain copies. We are glad to find in the *Zeitschrift* for May 15th, a review of it by no less an authority than Dr. Jelinek, the following translation of which will, we are sure, be acceptable to many of our readers, and well worthy of the space which it occupies; besides which it might not otherwise have been accessible in the English language.—Ed.]

THE task of the Meteorological Congress in Vienna, towards which we may now look with some confidence,\* will be considerably facilitated by the preliminary discussions which have taken place at Leipzig and Bordeaux, and by the written utterances, for which we have to thank several prominent meteorologists.

Prof. Buys Ballot has won great merit in this direction, first by his "Suggestions on a Uniform System of Meteorological Observations," published before the Leipzig meeting, and now again by the above cited work.

Both papers are devoted to the points raised in the programme which was laid before the Leipzig meeting. The time at the said meeting being rather short for the discussion of such numerous questions, Prof. Buys Ballot's present work is a useful supplement to the record of the proceedings of the Congress.

We take the liberty of remarking that on the first page the name of Director Wild is missing among the managers of the Leipzig meeting, who was most prominently active in it, and from whom emanated the programme, including the majority of the points discussed.

With respect to the significance of the questions treated at Leipzig, we coincide with the worthy author, when he lays the chief stress on a corresponding choice and distribution of the stations (especially out of Europe), as well as on the most suitable form for the publications. The points just mentioned are such as shortly require intervention on the part of the Meteorological Congress, and respecting which an agreement might well be arrived at without difficulty.

We cannot quite agree with the author (page 2) when he proposes leaving the choice of the observational methods and instruments wholly to the free judgment of single observers and directors. Meteorological observations, reaching over several countries, demand in the first place, like all statistical operations, the possibility of comparing the data on

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\* The Imperial Austrian Ministry of Instruction has answered affirmatively to the petition presented to them in accordance with the resolutions of the Leipzig Conference, concerning the invitations to the Congress, and other requisite measures.

which they are grounded, which can only then be guaranteed when a uniformity of the methods and of the applied apparatus is, at least to a certain degree, established.

On question 3 the author introduces a remark as made by me, that aneroid barometers perhaps might be found useful as a check on quicksilver barometers during the inspection of stations. I take the liberty of stating that this remark emanated from Mr. A. Buchan. My opinion is that aneroid barometers should be admitted to stations of the second order, when it is a question, not of the absolute value, but only of the variations of the air pressure. As long as an aneroid is not exposed to shocks (as when carried about), it goes pretty exactly parallel with a good quicksilver barometer,\* and is much easier to be read off by unpractised observers than the latter, so that the errors in reading off met with by every leader of a large system of observations are lessened. As a check on station barometers, I consider the aneroid less adapted, as its correction is far too easily altered by shocks. In order to be something like on the safe side, it would be necessary to carry three aneroids about with one; in that case the coincidence of two of them would offer some probability that the corrections of the same had not altered. At the fifth question of the Leipzig meeting, as to what instruments are applicable to the observations of radiation, the author recommends (page 9) the establishment of observational stations on high mountains, which should be furnished with the necessary apparatus, especially with spectroscopes. We agree thoroughly with the author, but beg, however, to remark here, that for the carrying out of such series of observations, scientifically educated observers, or proper physical expeditions, would be required, while at present one has generally less trained observers at mountain stations, than at those of less altitude.

With regard to the object of the ground temperatures (question 6), the author agrees with Buchan and the French meteorologists therein, that such observations possess greater value for the botanist than for the natural philosopher or meteorologist. For the physiology of plants and the enquiry into the laws of their growth, it would suffice to observe thermometers at a depth of 4, 8, and 12 in., and perhaps electrical thermometers for depths of 19, 27, 39, 59, and 79 in., the last for trees which have their roots at these depths. It would suffice for meteorological experiments to observe one or two of these thermometers, in order to derive from their indications in what manner the differences of temperature depend on the nature of the ground. For questions of physical geography electrical thermometers are required under the surface down to the stratum of unchangeable temperature at suitable distances one from another.

Few places are adapted for such observations. Many circumstances,

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\* Numerous comparisons of Naudet's Holosterics at the Vienna Central Institution give with regard to influence of temperature an average error of 0.2 mm. to 0.3 mm. (0.008 to 0.012 in.) However, these comparisons certainly do not range over a long space of time.

the nature of the ground, the downfall, which communicates the temperature of the high strata to the deeper ones, disturb the observation, and what has to be observed? The law of the conducting power for the warmth? If it be necessary to determine the quantity of warmth which flows from the interior of the earth through the surface, then the temperature must be enquired into at great depths. Only the Alps or other mountains can offer data of any value, yet as soon as a tunnel be driven through these they lose the attributed property, for the surface of the tunnel becomes continually cooled down by the air streaming through it, and nobody would wish to destroy the tunnel to the end that the thermometer might give correctly the true temperature of the earth at this depth.

With respect to the noting down of the *speed of the wind*, where numbering apparatus is used (question 10, page 16), the author declares for the units, meters, and seconds. We know very well that the Leipzig meeting expressed itself also in the same sense, yet it might be allowed to draw attention to the fact, that the sailor almost universally reckons the speed of the wind in sea miles per hour, or in kilometers per hour. The last unit is also used on the Continent, in Italy, Spain, Austria. The question arises whether the present usual unit is to be relinquished on the continent, when it is probable that the marine will hold to it? On page 17 the author recommends that the *time* should always be noted, when a wind has blown with a pressure of 30 kilogrammes per square meter, [6 lbs. per square foot]. We quite agree with this, but it is only practicable where one has a registering apparatus at disposal, and considering the class of the majority of anemometers in use, it were perhaps more to the purpose to fix a limit for the *speed* of the wind, than the pressure. The velocities of the wind are however extraordinarily varied according to the particular localities, and it might prove necessary in practice to take note of this when determining the before mentioned limit.

The importance of strict contemporary observations\* (question 18, page 26) for meteorological investigations, which comprise a greater part of the earth's surface, cannot be denied. The difficulty lies only herein, viz., that for other purposes observations made according to the local time are equally required, so that the burden of the duties of the observers is doubled, to which must still be added the circumstance that one or another of the synchronous observations may occur at a time very inconvenient to the observer. Such demands can by no means be made on volunteer observers, who are unremunerated, and who are occupied with other business callings; the synchronous observations must therefore be confined to the limited number of central observatories, which are besides mostly provided with registering apparatus.

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\* Prof. Buys Ballot very often makes use of the expression "astronomical time," in opposition to local time. It might be better to use instead of this "time of a first meridian," or "time of the synchronous observations," for as a rule the time used in astronomical calculations, refers to the *meridian of the locality*, and not to a fixed first meridian.

On page 33 the author speaks of the "Nouvelles météorologiques," which were published in the years 1868-1870 by the French Meteorological Society, which he calls a very valuable publication, and which it is to be hoped may be again undertaken before long. The form of the "Nouvelles météorologiques" appearing monthly, holding a middle place between a daily bulletin and an annual, seemed to us also a successful one. Whether the "Nouvelles météorologiques" be again taken up, or the "Bulletin mensuel" be continued, it would in any case, in the interest of French meteorologists, as well as of those of other countries who are referred to the above-mentioned publications, be desirable that they should possess a certain *stability*. With regard to the harmonizing form in which the observations of a station are to be published, the author proposes (page 34) 23 columns (with the date properly 24), viz., 3 for the atmospheric pressure, 3 for the temperature at the fixed hours of observation, 1 for the minimum, 1 for the excess of the maximum above the minimum, 6 for the vapour pressure (or the quantity of water contained in a given volume of air) and the relative moisture, 2 for the rain, 3 for the wind, 3 for the state of the clouds, 1 for remarks.

Director Wild has had the observations of a Russian station (Simferopol) printed, according to the views upheld at the Leipzig meeting, with the object of allowing meteorologists to express an opinion on the suitability of the arrangement. Wild's sketch only comprises 18 columns, viz., 1 for date, 3 for air temperature, 3 for relative moisture, 3 for height of barometer, 3 for direction and force of wind, 3 for state of clouds, 1 for downfall, 1 for remarks. By means of this arrangement it is possible to place *two* months observations of a station on one quarto page (325 mm. high and 245 broad) [ $12\frac{3}{4}$  by  $9\frac{1}{2}$  in.], which would be hardly possible in the case of Prof. Buys Ballot's proposal. Now the question of cost must by no means be left out in this matter, particularly as regards those countries where hitherto no original observations had been published. A result could only be obtained here on the supposition that the demands be limited to the extent of what is indispensibly necessary for meteorological labours. For this reason I would prefer the form proposed by Director Wild.

Further I do not think it was the idea of the Leipzig meeting, to publish annuals over and above these monthly sheets, which should contain the observations in a more detailed state. The scheme with which the committee formed at Leipzig, occupied itself, and which is now carried out experimentally by Director Wild, is precisely to establish uniformity in the annuals published by the central observatories. The summaries of the weather formed on the basis of the telegrams are intended for preliminary information of the atmospheric movements over large extents. It must certainly, however, be here assumed that the publication of the annuals speedily follow, in which direction the leaders of many systems of observation have struck out already with an example worthy of imitation.

In a notice (on page 35) the author discusses a plan of Koepkens,

published in the *Zeitschrift*, vol. viii., page 17, concerning the establishment of an "International Meteorological Institute." The author, while agreeing with the general plan of the distribution of the central observatories, and the establishment of similar new institutions, considers a convocation of 35 Directors too numerous, and fears these would exercise too great an influence on the separate observatories. The meeting should only facilitate communication between the separate central observatories, but not dictate to them their labours. We must admit that this reflection against Koeppen's proposal did not strike us; we do not find that he speaks of a council of 35 Directors, and it would still always be possible to preserve independence of the separate central institutions, in the organization proposed by him.

On page 37 the author repeats a proposal already made by him in a previous article regarding the "Aeroclinosope,"\* of a registration of the atmospheric conditions of distant stations by means of electricity, on page 40, that of a better distribution of the stations, so that especial care was to be taken for the erection of stations in Africa, South America, and the Polar regions.

In conclusion, the author discusses the observations *at sea*, and the manner and method by which the extracts had been obtained from the ship's journals at the Netherlands Meteorological Institution by the director of the Marine department, Mr. Cornelissen, and in what manner hereafter the meteorological conditions will be deduced of certain parts of the surface of the sea. The manner and method by which the best routes for ships, are ascertained at the said Institution, is also thoroughly explained. Consequently it is a rich addition of valuable materials, based on the observations and experiences of many years, which the esteemed Director of the Utrecht Meteorological Institution now places at the disposal of the scientific public in general, and the Meteorologist Congress at Vienna in particular.

C. JELINEK.

### CYCLONE AND ANTI-CYCLONE.

*To the Editor of the Meteorological Magazine.*

SIR,—Your readers will, I believe, thank me for having elicited from so high an authority as the Rev. W. Clement Ley an exposition of his views regarding "anti-cyclones."

The difference between us is sufficiently simple and definite. We agree that there may sometimes be observed about a centre of barometric elevation an apparent circulation of air opposite in direction to that which prevails about centres of depression. Mr. Ley conceives that "a causal relation exists just as much between each centre of elevation and the rotation of the winds about it, as between each centre of depression and the rotation of the winds about it." I have ventured to suggest that the only true causal relation is between the rotation of

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\* *Zeitschrift*, vol. iii., pages 402, 428, & 449.

the winds and the centres of depression, the other relation being accidental only, and illusory.

My remarks were limited to an endeavour to show that the supposition of this other relation was superfluous, the observed facts being capable of explanation without it. I do not find in Mr. Ley's reply any reason to abandon this position. It cannot, I think, be denied that if an area of barometric elevation be, as I have supposed, only a space between surrounding depressions, the effect of the retrograde rotation of the wind about these must be to produce a more or less distinct appearance of direct rotation about the centre of elevation, somewhat in the same way that a number of rotating cog-wheels placed in connection with a central cog-wheel will cause the latter to assume a rotation contrary in direction to their own. The analogy is not perfect, for according to my view there is no real circulation about the centre of elevation, although the direction of the wind at several detached spots may be consistent with such an explanation. To put the matter in a more concrete form, I should say that if a balloon were sent up at each of the points where the supposed circulation was observed, the balloons, after moving for a little time in conformity with the theory, would presently fall off each into its own system of circulation about a centre of depression.

Mr. Ley objects that if an area of elevation be only an interspace between surrounding areas of depression, it cannot be circular, but must have the form proper to interspaces between contiguous circles, whereas actually (he says) many areas of elevation are quite as circular as areas of depression. Mr. Ley no doubt means that the areas bounded by the isobaric lines about centres of elevation are often regular circles. But it must be remembered that these lines do not necessarily represent—indeed it is only by a rare chance that one of them can represent—the extreme outer boundary of the area. And whatever may be the irregularities of this outer boundary, it is easy to see that in a series of isobaric lines about the point of highest pressure, these irregularities may become toned down as the distance from their source increases, and finally obliterated.

Any one who will be at the pains to examine a sufficiently long series of weather charts, showing isobaric lines and currents of wind, may satisfy himself of the following differences between the characters of barometric elevations and those of barometric depressions.

First, the tendency to circularity of the isobaric lines is, on the whole, much more marked in the case of depressions than it is in the case of elevations.

Secondly, the intervals between the lines, as a rule, become smaller towards centres of depression; wider towards centres of elevation.

Thirdly, the force of the wind, being proportionate to the closeness of the lines, or the "steepness of the gradient," is generally strong in force, and definite in direction over areas of depressions, very light and inconstant over areas of elevation.

These differences seem to me to indicate unmistakeably a positive or

active character about the depressions, a negative or passive character about the elevations. For typical examples I refer the reader to the British Weather Charts of February 2nd and February 18th of the present year.

Mr. Ley is inclined, I think, to over-rate the advantage, in point of brevity, of the term for which he pleads. It would be possible to discard it without resorting to the portentous periphrasis which he puts forward as its alternative. "Area of elevation," although longer by four letters than "anti-cyclone," is by no means an unwieldy expression.

GEO. F. BURDER, M.D.

Clifton, June 10th, 1873.

### EARTHQUAKE AT DONCASTER.

*To the Editor of the Meteorological Magazine.*

SIR,—On 29th April last, at 2.40 p.m., a smart shock of earthquake was felt in this town and at a few places adjacent, the furthest we have heard of being Bawtry, 9 miles south, and Conisbro, 5 miles westward. We have no other report of such an event from any more distant part of the country. Considering the severity of the shock, this is perhaps more remarkable than the event itself.

I was at the time sitting in my chair reading, and was startled by a decided movement of the house, and a noise as of a heavy body falling in some up-stairs room—from the shock I judged heavy enough to have gone through any floor in the house. Hearing no sounds of alarm or further commotion, I went into an adjoining room, where two persons were employed (standing); to my surprise they had perceived nothing unusual; my expectation was, that there had been an explosion of gas in the cellars; on making further inquiry in the house, I found one of the servants had noticed a shaking of windows and noise overhead, which she could not account for.

We were, however, not long in doubt as to what had occurred; reports came in from all parts of the town, in the higher parts the shock was felt so severely that many people ran out of their houses in alarm; some people state they were thrown off sofas and chairs; no damage was done, however, excepting a few glasses being overturned and broken.

So far as I could judge, the movement was from west to east and back again, the noise no doubt arose from movement of the walls of the houses, the atmosphere at the time being clear and cool.

I am late in sending you this account, and am unable now to obtain one of the local papers containing their report; this I regret, as many details, too long for a letter, were given therein. Possibly a notice of the above in the *Meteorological Magazine* may elicit the fact that Doncaster cannot yet claim an earthquake entirely to itself.—Yours truly,

JAMES HOWORTH.

Doncaster, May 18th, 1873.

[We quite share our correspondent's surprise at so extremely local a shock.—Can it have been a genuine earthquake. Ed.]

## ON THE PRACTICABILITY AND UTILITY OF WEATHER AND STORM SIGNALS IN EUROPE.

[The following letter and questions are self-explanatory; it is therefore only necessary to state that we have inserted them in the *Meteorological Magazine* with the concurrence of Mr. Scott, because we know that many of our readers are able, (and we hope willing) to supply useful replies to the several queries. It is almost superfluous to remark that all communications on the subject should be sent to Mr. Scott, and not to ourselves.—ED.]

116, *Victoria Street, London, S.W.*,  
30th April, 1873.

SIR,

The Sub-Committee appointed by the Meteorological Conference at Leipzig to draw up a Report on the subject of "the practicability and utility of Weather and Storm Signals in Europe," for presentation to the proposed Meteorological Congress at Vienna, have agreed to issue the following questions, in the hope that you and other gentlemen, to whom this letter may be addressed, may be disposed to favour them with your observations thereon.

They have agreed to issue the subjoined Series of Questions, and have furthermore arranged to divide among themselves the labour of communicating with the several gentlemen whose views it is of importance to ascertain.

The following is the arrangement adopted :—

M. BUYS BALLOT to communicate with	{	France, Spain, Portugal, Holland, Belgium, Italy, and the United States of America.
HERR NEUMAYER                   "           "	{	Germany, Austria, Switzer- land, and Norway.
MR. SCOTT                               "           "	{	Russia, Sweden, Denmark, Hamburgh, the United Kingdom, and its Colonies, &c.

I have the honour to be, Sir,  
Your obedient Servant,  
ROBERT H. SCOTT.

### I.

What are your opinions in respect of the action of the systems of Storm Signals hitherto in use, either from your own experience, or from a consideration of the Bulletins published in the United States, in England and in France?

## II.

Is it your opinion that in addition to communications of the Direction and Force of the wind which is actually blowing, the Barometrical "Gradients" should be given, in order to give warning of approaching wind?

To what should these gradients be referred? Viz. :—

A—To the differences between the actual readings at the different stations.

B—To 30 ins. at sea level.

C—To the mean normal heights of the barometer at the stations taken into consideration.

## III.

In what way should we take into consideration Temperature, Vapour, &c., &c.?

## IV.

If we assume that each Director will institute the proper arrangements in his own district, what do you recommend as the minimum that each Director should communicate to the Director of another district, and should receive from him in return?

## V.

Are you of opinion that the present condition of our weather knowledge justifies us in issuing distinct prophecies or forecasts of weather in contradistinction to the simple Telegraphic communication of facts, or should we confine ourselves to indications of the condition of the atmosphere in adjacent countries, from which the recipients of the Report must draw their own conclusions? In the latter case should we communicate the general conditions by Signals visible from a distance, posting up, at the place itself, the detailed information received from other localities?

## VI.

In what way can it be arranged that intelligence of the conditions of weather can be conveyed to ships at sea, by means of Semaphores or by Signals from Lighthouses?

## MAY FROST.

*To the Editor of the Meteorological Magazine.*

I have again to report an unusually severe frost, by which potatoe shoots have been killed, ash leaves blackened, and much other harm done. On the 20th May the minimum registered at 4 ft. was 24°·9 and 19° on grass. At my anemometer station, however, it was not below about 31° at 4 ft. and 35° at 18ft.—Yours, &c.

F. W. STOW.

*Harpden, St. Albans.*

MAY, 1873.

Div.	STATIONS. [The Roman numerals denote the division of the Annual Tables to which each station belongs.]	RAINFALL.					Days on which "01 or more fell.	TEMPERATURE.				No of Nights below 32° In shade On grass.
		Total Fall.	Difference from average 1860-5		Greatest Fall in 24 hours.			Max.		Min.		
			inches.	in.	Dpth	Date.		Deg.	Date.	Deg.	Date.	
I.	Camden Town .....	1.56	— .84	.52	7	14	72.9	26	32.9	20	0	2
II.	Maidstone (Linton Park).....	.97	— 1.27	.45	8	12	77.0	26	29.0	14	2	...
„	Selborne (The Wakes).....	1.90	— .58	.51	7	11	65.6	26	26.5	20	2	4
III.	Hitchin .....	1.80	— .13	.29	7	16	68.0	30	30.0	19	2	...
„	Banbury .....	2.48	+ .26	.40	5	16	70.5	3	30.0	20	2	...
IV.	Bury St. Edmunds (Culford).....	2.16	0.00	.33	21	13	69.0	26	29.0	19	1	7
V.	Bridport .....	.88	— 1.15	.27	7	8	70.0	30	30.0	20	1	...
„	Barnstaple.....	2.30	— .14	.60	20	11	72.0	14	37.5	20	...	...
„	Bodmin .....	2.10	— .36	.73	7	13	67.0	29	38.0	4, 6	0	2
VI.	Cirencester .....	2.60	+ .32	.55	7	15	...	...	...	...	...	...
„	Shiffnal (Haughton Hall) .....	2.70	+ .44	.56	5	14	65.0	26	33.0	18	0	...
„	Tenbury (Orleton) .....	2.38	— .50	.68	5	14	72.0	12	30.8	20	1	8
VII.	Leicester (Wigston) .....	2.03	— .09	.25	5	11	71.0	29	31.0	19	...	...
„	Boston .....	2.40	+ .46	.47	26	16	67.0	26	34.0	20	0	...
„	Grimsby (Killingholme) .....	2.29	...	.48	26	17	64.0	11*	33.0	20	0	...
„	Derby.....	2.31	+ .15	.39	17	17	68.0	31	35.0	20	0	...
VIII.	Manchester .....	1.91	— .75	...	...	17	...	...	...	...	...	...
IX.	York .....	2.25	+ .30	.42	5	15	63.0	26	33.0	20	0	...
„	Skipton (Arncliffe) .....	2.55	— .80	.47	5, 22	20	67.0	27	26.0	19	4	...
X.	North Shields .....	3.04	+ .40	.50	5	22	61.7	21	33.0	20	0	1
„	Borrowdale (Seathwaite).....	5.58	— 3.96	1.70	20	17	...	...	...	...	...	...
XI.	Cardiff (Ely) .....	...	...	...	...	...	...	...	...	...	...	...
„	Haverfordwest .....	3.25	+ .53	1.31	5	...	67.0	13	30.0	19	3	7
„	Rhayader (Cefnfaes).....	3.41	+ .56	.57	30	9	71.0	...	30.0	...	...	...
„	Llandudno.....	1.19	— 1.19	.26	17	11	67.7	31	35.5	20	0	...
XII.	Dumfries .....	1.63	— .76	.33	16	15	69.0	31	31.0	19	3	7
„	Hawick (Silverbut Hall).....	1.91	...	.38	16	15	...	...	...	...	...	...
XIV.	Kilmarnock (Annanhill).....	...	...	...	...	...	...	...	...	...	...	...
XV.	Castle Toward .....	3.18	— .21	.68	6	17	67.5	31	...	...	1	...
XVI.	Leven (Nookton) .....	2.77	+ .77	.66	5	16	64.0	1	30.0	4	3	15
„	Stirling (Deanston) .....	3.17	+ .52	.46	5	20	67.9	31	25.4	4	6	8
„	Logierait .....	2.43	...	.49	5	17	...	...	...	...	...	...
XVII.	Braemar .....	6.18	+ 4.38	2.02	5	18	66.2	31	25.2	19	9	16
„	Aberdeen .....	2.69	...	.95	5	19	63.5	21	33.4	19	0	15
XVIII.	Inverness (Culloden) .....	3.18	+ 1.62	.74	6	20	56.6	31	34.7	16	0	9
„	Portree .....	4.33	— 1.32	.99	5	18	...	...	...	...	...	...
„	Loch Broom .....	2.39	...	.46	11	19	...	...	...	...	...	...
XIX.	Helmsdale .....	2.43	...	.48	9	17	...	...	...	...	...	...
„	Sandwick .....	1.71	— .55	.38	1	14	...	...	...	...	...	...
XX.	Caherciveen Darrynane Abbey .....	3.03	...	.90	4	17	...	...	...	...	...	...
„	Cork .....	1.47	...	.64	4	...	...	...	...	...	...	...
„	Waterford .....	1.36	— .89	.43	4	13	72.0	28	35.0	19	...	...
„	Killaloe .....	3.09	— .09	.78	6	17	78.0	29	32.0	20	1	5
XXI.	Portarlinton .....	1.78	— 1.42	.28	8	21	71.0	30	32.0	18	1	...
„	Monkstown .....	.67	— 1.24	.12	8	10	...	...	...	...	...	...
XXII.	Galway .....	2.40	...	.44	17	16	69.0	16+	34.0	19	0	...
„	Bunninadden (Doo Castle) .....	2.45	...	...	...	...	...	...	...	...	...	...
XXIII.	Waringstown .....	1.84	...	.38	16	13	75.5	25	28.5	7	2	9
„	Edenfell (Omagh).....	2.36	...	.33	22	18	70.0	29	23.0	18	4	...

\*And 12. †And 29.

+ Shows that the fall was above the average ; —that it was below it.

METEOROLOGICAL NOTES ON MAY.

ABBREVIATIONS.—Bar for Barometer; Ther. for Thermometer; Max. for Maximum; Min. for Minimum; T for Thunder; L for Lightning; TS for Thunderstorm; R for Rain; H for Hail; S for Snow.

ENGLAND.

LINTON.—A dry cold month, the thermometer several times approaching a frost (even up to the end of the month), but only two were absolutely registered. T on 9th; barometer generally high; prevailing winds N. and N.E., and vegetation very backward for the end of May, but on the whole the frosts did less damage to the fruit blossoms than usual, the air being very dry.

SELBORNE.—On the 20th the temperature fell to 26°·5; many plants and trees cut—roses, oaks, beeches, ash, walnuts, &c.; hay crops not promising from want of rain; prevailing winds, first ten days S.W., last ten days N. and N.E. On 8th wind in early morning N.E., and S.W. in afternoon; T at 6.30 p.m.; H at 2 p.m. on 27th, 13°·5 difference between the minimum temperature on 1st and 2nd, the 1st being 48° and the following days only 34°·5.

HITCHEN.—T on 27th.

BANBURY.—Hail and high wind on 3rd; TS on 6th.

CULFORD.—Another month of cold and sunless weather, with max. temp. lower than that of April preceding, being 69°·0 to 71°; a TS accompanied by H on the 3rd; T also on 9th and 23rd; sharp frost on the night of the 19th, which did much injury to vegetation, although a thermometer at 4 ft. from the surface of the ground, fell to only 29°; mean temp. of the month about 50°. Polar winds during 7 days; westerly or equatorial during 24 days.

BRIDPORT.—Another month of little rain, only 1·64 in the months of April and May; several sharp frosts, but that on the 20th though only slight, did more damage than any preceding frost.

HAUGHTON HALL, SHIFNAL.—The first part of the month was cold, with rain daily till 9th, including a continuous fall on two of the days (4th and 5th) of 1·03. The prevailing winds (with occasional changes to E.) were from N. and N.W., from the 20th it became somewhat milder, but on no day above 65°; vegetation backward but healthy; the eclipse on the 26th quite visible throughout, only veiled in fleecy clouds; cuckoo first heard on 2nd and turtle dove on 19th; flycatcher arrived on 22nd.

ORLETON.—A dry and pleasant month, but generally cloudy and cold, with a small proportion of bright days; the mean temperature about 1°·5 less than the average; no T heard or L seen; frequent slight frosts in the mornings; generally a brisk drying wind, with very few calm days; great blossom on the apple trees in the middle of the month; the first whitethroat seen on the 1st.

WIGSTON.—Prevailing winds N.E.; the month, as a whole, has been ungenial, and has kept the pasture land very bare, and the corn, though looking healthy, is very backward; the mean temp. rather below the mean of the month; T at Leicester in the afternoon on 26th.

BOSTON.—Cuckoo heard on 9th; thorn may in flower on 21st; temperature first 20 days in May 48°, first 14 days of January 45°.

GRIMSBY.—Saw lesser whitethroat on 3rd; spotted flycatcher on 21st; apple began blossom on 12th; monthly rose on 28th; TS at noon on 3rd, at 11 a.m. on 8th, at 1.15 p.m. on 23rd, and at places near on 26th; grass rather scarce, and wheat in heavy lands looking thin; fair prospect of a fruit crop.

DERBY.—Mean reading of solar radiation ther. 109·8, max. 121·0 on 27th.

YORK.—TS with H on 3rd; T on 8th.

ARNcliffe.—Very dry, and average temp. of the month unusually low, especially in the nights. S on 17th.

SEATHWAITE.—S on hill tops on 3rd, 7th, and 17th; very little R.

WALES.

HAVERFORDWEST.—A cold backward month, more like May, 1853, than any since that time; N. and N.E. winds prevailed throughout, with some sharp nights of frosts; drier than usual.

**CEFNFAES.**—The month dry, cold winds, with more or less frost at night ; wind generally N., N.E., or N.W.

**LLANDUDNO.**—General character of the month warm sun, and cold wind, with very little rain ; swallows first seen on 1st ; lilac flower on 3rd ; honeysuckle on 19th ; hawthorn on 20th ; laburnum on 21st, and mountain ash on 26th. TS between 1 and 2 p.m. on 23rd.

#### SCOTLAND.

**DUMFRIES.**—The first half of the month dry and cold, with occasional slight showers. On morning of 19th all the hills covered with S, and the higher ranges were not quite free from S until near the close of the month. During the latter half of the month there were refreshing showers, with a higher temp., and vegetation was much revived. On the morning of 14th, the frost injured the early potatoes. The night temp. has been below, and the day somewhat above the average, thus making the mean nearly the same as last year. T on 22nd.

**HAWICK.**—The month has been cold and unkindly towards vegetation ; early potatoes sadly nipped by the frosts of the 16th, 17th and 18th. The hills were white with S on 16th, and on the morning of 30th the drinking troughs were covered with ice as thick as a shilling ; rain is now much wanted.

**DEANSTON.**—In the early part of the month cold and ungenial, from 16th to 20th hills around covered with S ; corn crops much injured by the worm. In the end of the month, more mild and favorable, and crops improving.

**ABERDEEN.**—A month of cold and (during the first two weeks) wet weather. Vegetation very backward, but still considerably injured by night frosts.

**PORTREE.**—A very cold month, with S and H showers, and keen frost at night, which has retarded vegetation much. Cattle badly off for want of grass.

**LOCHBROOM.**—A very cold and dry month ; grass and cereals very backward ; want of rain much felt ; the end of the month moderately fine weather.

#### IRELAND.

**DARRYNANE ABBEY.**—1st to 8th cold, with N. and N.W. winds, except on 4th, when it was S.W. ; 8th to 19th, easterly winds and cold ; remainder of the month wind variable, but generally from N.W., and warmer weather, especially the last few days. Vegetation very backward in the early part of the month, but progressing rapidly towards the close. The turf (peat) cut for fuel *last* May and June, is only saved and fit for use *now*, in most parts of this neighbourhood, owing to the constant rain of the past year.

**MONKSTOWN.**—Very dry month.

**DOO CASTLE.**—Remarkably fine month ; there was a prevalence of easterly winds, which retarded vegetation ; and pasture ground, meadows, and oats have suffered ; potatoe crops healthy ; peat cutting well attended to this month.

**WARINGSTOWN.**—Crops suffering for want of rain, hay will be deficient.

**EDENFELL, OMAGH.**—Although with a fair amount of rain and sunshine, the weather of the month has been unfavorable to vegetation, notably to grass, principally owing to occasional sharp frosts and ungenial northerly winds, otherwise agricultural prospects are encouraging.