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THE LEIPZIG CONFERENCE.

Mr. Scott has rendered a service to many British, American, and Colonial Meteorologists, by the translation of the "Bericht über die Verhandlungen der Meteorologen—Versammlung zu Leipzig," which was published as a supplement to Dr. Jelinek's "Zeitschrift." We regret the time which has elapsed before it has appeared, but believe the responsibility thereof rests rather with the compilers of the Report than with the translator. But in any case it is a pity that half the time (available for discussion and experiment) between the Leipzig and Vienna conferences, has elapsed before many persons know what was done.

It was evident that the promoters cut out too much work for a sitting of only three days; the Conference discovered this early on the second day, and delegated to a committee the important subject of Marine Meteorology, and later in the same day two-thirds of the whole questions were referred to separate committees.

If the opinions of the Vienna Conference are to claim respect as the deliberate conviction of the ablest Meteorologists of the present day, steps must be taken to secure a much fuller discussion of each subject.

We by no means share the opinions of those who hold that the Leipzig Conference was a comparative failure because so little was finally settled; on the contrary, we agree with M. Buys Ballot, who, in opening the Conference, said that "it was of great interest to have received in writing the opinion of some of the most eminent men in Meteorological science," and we are sure that the report of the sayings of those present were of equal or greater value. Supposing that we were not one step nearer uniformity than before, we should still hold that the Conference was a success. Will any reader refer us to a meteorological publication, of the same size as the Report, which contains half as many useful hints as it does?

Efforts should be made to secure a more thoroughly cosmopolitan meeting at Vienna; only one representative of the New World was at Leipzig, Dr. E. H. Sell of New York, and he appears to have taken no part in the proceedings, while at least four-fifths of those present were Germans. We yield to none in our appreciation of what the Germans are doing for Meteorology, but they will recognize as readily

as any of our readers, that in an International conference, when votes on important points are to be counted, it is essential that some principle of weighting the votes be introduced. This may be done by limiting the number of representatives allowed to each country, or by giving to each representative a number of votes, regulated by the number of stations under his control.

This leads to another question. On the continent a majority of the stations are under Government control, and hence doubtless the rumour that the Vienna meeting is to be limited to "State Meteorologists." Englishmen, however, view matters differently; the native independence of the race finds its natural manifestation in wide-spread amateur research. Let anyone look over the roll of England's foremost men of science, and then say, if they can, that English Amateur Science needs no representative. Take Astronomy, what are De la Rue, Huggins, Lassell, or the late Lord Rosse but amateurs, yet would it be wise to exclude their opinions from any representation at an Astronomical Conference? And so with Meteorology; not only do the amateur stations altogether outnumber the official ones, but we do not know, either in this or any other country, any Government work which can be held superior to that of Colonel Ward, at Calne, Mr. Chrimes, at Rotherham, and Rev. C. H. Griffith, at Strathfield Turgiss, yet they are only amateurs, and therefore must be ignored. Surely the absurdity of a conference with many of the best men shut out would be too ridiculous to be persisted in.

Having thus expressed our opinion on the general conduct of the Conference, we proceed to epitomize the Report, which consists of five parts (1), the invitation and questions to be discussed; (2) list of persons present; (3) report of proceedings; (4) written replies; (5) Discussion on the questions at the Bordeaux meeting of the French Association for the Advancement of Science, Meteorological section.

This arrangement, although the proper, not to say the only one suitable as a record of proceedings, has the great disadvantage that it separates the remarks upon the several questions so much that complete information as to what was said, written and done, on any one subject, can only be ascertained by hunting all through the book. Take the question of thermometer stands; which is referred to on pages 6, 14, 15, 16, 17, 47, 49, 54, 56, 59, 65, 67. When we consider that among the principal speakers were Buys Ballot, Bruhns, Jelinek, and Wild, and among the writers, Dove, Mohn, Muhry, Wolf, and others, it cannot be inexpedient to take such steps as shall give to their opinions all the advantages which can be conferred by arrangement and concentration. We hope that the report itself is already in the hands of most of our readers, but we think they will nevertheless agree with us that it will be convenient to have it also in a systematically arranged and condensed form. Written opinions will be prefaced by the letter W (wrote), and verbal ones by the letter T (thought), and more attention will be paid to brevity and clearness than to grammatical accuracy of language.

With this brief introduction we proceed to question—

(1) *Is it desirable to introduce the same units of measure (viz. of length, degrees, and time) in meteorological inquiries in all countries, or is it sufficient to lay down certain fixed rules for the conversion of the different measures employed in the several countries?*

M. DOVE (W.) That the introduction of the centigrade scale was not advisable until the English and Americans gave up Fahrenheit's. In all the older tables, Fahrenheit's and Reaumur's predominate. Forbes's attempt to introduce the Centigrade at Chiswick failed. Fahrenheit's has the advantage of giving only positive quantities almost all over the temperate zone. Centigrade might be improved by adding 100 to it (*i.e.*, make freezing 100° and boiling 200°). Sole inconvenience of Fahrenheit, is in inquiries as to distribution of plants, when readings above freezing are alone used.* Metrical system would be awkward for barometers, as nearly all maritime nations use English scale.

Sr. F. de SILVEIRA (W.) Doubtless, Centigrade for thermometers, metric for barometers. If this cannot be done at once, mean and extreme results should be published in those scales.

M. CARL FRITSCH (W.) Very desirable, but can hardly ever be carried out; it is therefore unavoidably necessary to settle definite rules for conversion.

CAPTAIN HOFFMEYER (W.) In Denmark use only centigrade and millimetres.

Dr. MOHN (W.) Centigrade and millimeters.

Mr. SYMONS (W.) Identity of scale not necessary, but improved conversion tables are. Knows of none better than Guyot's, which in some respects might be improved.

BORDEAUX MEETING (W.) Uniformity highly desirable, but not attainable for many years; steps should therefore immediately be taken to secure conversion in publications of an international character.

M. BRUHNS (T.) The decision should be postponed until the result of the metric Conference at Paris was known.

Mr. SCOTT (T.) The Conference would waste time if it discussed a question which could only be settled by Governments; he thought England was less inclined to adopt the metric system than formerly; Fahrenheit degrees were convenient for telegraphy.

Mr. BUCHAN (T.) The question was important, but not vital, was in favour of metric scale, the Conference should recommend its adoption, and also the publication of conversion tables.

M. PRESTEL (T.) The metric system best, as it offers simple relations between linear and cubic units.

M. BUYS BALLOT (T.) That Mr. Buchan's proposal met the case, and that mean values should be given in the metrical scale as well as in the original whatever that might be.

* We do not see the force of this objection. Dove's words are, "Der einzige Uebelstand der Fahrenheit'schen Scala zeigt sich bei pflanzengeographischen Untersuchungen, weil man in diesen nur Zahlen benutzt, die den Frostpunkt übertreffen."

This proposal was adopted by the meeting.

(2). *What is the best form of barometer for stations of the second order? Is the use of Aneroids for such stations admissible?*

SR. F. da SILVEIRA (W.) Adie's mercurial, used for ships and for stations affiliated to the observatory—Aneroids only used temporarily.

M. CARL FRITSCH (W.) A very simple syphon barometer—Aneroids must not be used.

CAPT. HOFFMEYER (W.) Kapeller's station barometers, not aneroids.

DR. MOHN (W.) Aneroids not to be used for fixed stations.

PROFESSOR RAGONA (W.) Aneroid cannot be recommended, but might do for stations of the second order.

MR. SYMONS (W.) "Kew pattern," mercurial. Has a very high opinion of aneroids, but only when they can be frequently compared with a mercurial barometer.

BORDEAUX MEETING (W.) Mercurial only, but something cheaper than Fortin's. There are some with moveable cistern divided on glass at about £1 10s., others requiring only one reading, divided on glass or copper. M. Baudin has also announced one said to be very accurate and moderate in price.

M. BUYS BALLOT (T) hardly anyone would recommend aneroids for scientific purposes.

M. PRESTEL (T) the value of aneroids for scientific purposes should be discussed.

M. JELINEK (T) for stations of the second order aneroids were not bad, also for ship use, the ordinary marine barometer being too sluggish. The defects of aneroids may fairly be contrasted with difficulties in handling and suspending mercurial barometers.

MR. BUCHAN (T) That M. Jelinek's views were correct. Aneroids might be trusted for very short intervals of time, and even mercurial barometers occasionally got out of order. Considering the facility of transport and comparison, aneroids should not be taken out of the hands of meteorologists.

M. BRUHNS (T) Aneroids were not scientific instruments, but were often very useful. He proposed to refer the subject to a committee.

MR. SCOTT (T.) The aneroid is an instrument the error of which is constantly changing, and which therefore cannot be used at all. The more costly ones with thermometers were even worse than the others, for in certain cases the quicksilver of the thermometer destroyed the whole instrument.

M. VON FREEDEN (T.) Aneroids which give correct readings with mean pressures, fail with extreme ones, and in such cases undergo permanent change of corrections. He agreed with Mr. Scott.

M. WILD (T.) Aneroids should not be entirely rejected. They are at least good as interpolation and difference instruments.

M. MULLER (T.) Aneroids should not be used.

The President, M. BUYS BALLOT, summarised the discussion as

follows : "The aneroid should not be used instead of the mercurial, but only as an interpolation instrument in addition thereto." *

M. BRUHNS suggested MM. Jelinek, Hann, and Buchan, as a committee to decide on a mercurial barometer for stations of the second class.

M. von OETTINGEN (T.) The matter too important to hand over to a committee.

M. WILD (T.) It was a bad plan to appoint a committee whose members lived in different countries. Eventually M. Hann was requested to undertake to report after consulting foreign authorities.

(3) *What mode of exposure of thermometers for the observation of air temperature is the best and most suitable for general adoption?*

SR. F. DA SILVEIRA (W.) they should be exposed to the free action of the wind, from every direction, sheltered from the sun, rain, and radiation, and protected by double louvered screens.

M. CARL FRITSCH (W.) They should be quite in the open air, about 6 ft. above ground. A wire should be stretched between two posts, and the thermometer hung from the middle. It will thus be exposed to rain, and sun, but if divided on its stem, and with a small cylindrical bulb the effect either of evaporation or insolation is slight, and compensatory. At all events disturbing influences are less than those of any screen or building (Cited Lamont's *Jahresbericht der kön. Sternwarte bei München* 1852, in support of his views).

CAPT. HOFFMEYER (W) In Denmark the thermometers are in a wooden louvered screen facing North.

DR. H. MOHN (W.) Stevenson's stand—In Norway the thermometers at the telegraph stations must be outside the windows, or the telegraph staff could not observe.

Prof. RAGONA (W.) draws a distinction between temperature in an open place, exposed to the sun (as a garden or terrace), and that outside a large window, facing north, in a lofty building, which he thinks the best place. Recommends that no more shelter from rain, &c., than is absolutely necessary be supplied, objects to double and triple louveres and roofs, also to aspirators, but is convinced a film of air adheres to a thermometer, which should be removed by gently fanning it.

MR. SYMONS (W.) Very elaborate experiments had been made in England upon the subject, of which he forwarded a description. He hoped the results would soon be published.

BORDEAUX MEETING (W.) One of the most delicate questions in meteorology. Differences of exposure affect extreme temperatures much more than means. In France thermometers generally sheltered by a double roof, sloping to south and about 3 ft. square; they are away from buildings, and placed about 6 ft. above grass. In other countries they are often placed in screens of louveres, &c., in which case the radiation of the sky is replaced by that of the screen. Uniformity cannot be

* We should be glad to have further evidence in support of the serious charges made against aneroids by several speakers. They differ much from our own experience.

expected at once; comparisons must be made both as guides for the future and correctives for the past.

Mr. BUCHAN (T) A very important question, including, as it did, the height of the thermometers above ground. No positive conclusions having been arrived at, suggested that statistics be collected from institutions and observatories relative to the height of the thermometers above the ground, and the methods by which they are protected, and a report thereon prepared for the Vienna Congress as a basis for discussion of the whole subject. In Scotland Stevenson's stand (over grass) is used.

Mr. SCOTT (T.) Stevenson's stands good, except in heavy snow. Glaisher's as good as useless. Mr. Buchan's proposal hardly practicable. Drew attention to a long series of observations by Mr. Griffith, which embraced 16* modes of exposure, the observations being made several times daily, and whereof the results might soon be published.

M. BRUHNS, (T) comparative experiments should be made at central stations. Wished that directors of organizations present should describe the modes in use. Exposure at a window was usual in Saxony.

M. WILD explained the Swiss mode of exposure behind double cylinders of sheet iron, pierced with holes, and with louvred roof. But these must not be brought near heated walls, nor exposed to the sun; therefore in Russia they are further enclosed in a double wooden envelope to guard against the Northern winter sun, and against heat radiated from walls.

M. JELINEK explained the plan adopted in Austria. Although very desirable to give up exposure at windows, some attention must be paid to the convenience of observers, especially volunteers. He also called attention to M. Renou's proposed rotation thermometer.

M. VON OETTINGEN (T) In northern countries it was simply impossible to give up exposure at windows, and a compromise must be accepted.

M. EBERMAYER said his Government had given him ample funds to carry out any plan thought best. He thought complete trustworthiness could only be secured by Government support.

M. VON FREEDEN had tried Stevenson's screen, but his instruments being meddled with, he had now placed them in deep shade on the south side of his house, in a louvred screen, and read them with a telescope. He found they agreed with others mounted on the Prussian system.

M. RUHLMANS (T) An aspirator should be used; he had found it accurate.

BARON VON STERNBACH approved of the Austrian plan, the usual

* In the original this number was given as 20; in the English edition Mr. Scott says "the real number is 10, not 20."—It so happens that neither is correct—twelve are described on page 2 of Vol. IV. of this magazine, two new ones ("Shrubbery" and "Stow, No. 2") were supplied afterwards, and the conditions of two others altogether changed. An entirely different and specially constructed thermometer was added to the "Suspended" one, and both were raised from 13 ft. to 24 ft. above the ground, and "Stevenson" was moved from the experimental field to the N. side of the Rectory, in order to measure the effect of such a position.—G. J. S.

distance (3 feet) from the wall excluded its influence, and he had found the same temperature on all sides of his house.

Several speakers undertook to make comparative observations.

THE President, M. BUYS BALLOT pointed out that the only question was to determine local temperature accurately, and eventually MM. Scott, Wild, Jelinek, and Prestel were requested to investigate the various modes of exposure, and the debate was closed.

(4.) *What is the best construction of Maximum and Minimum Thermometers?*

SR. F. DA SILVEIRA (W) Negretti's max. and Rutherford's. min.

M. CARL FRITSCH (W) Walferdin's max. and Baudin's min.

PROF. RAGONA (W) Bellani's thermometer should be improved and used.

BORDEAUX MEETING (W) Walferdin's maximum is almost perfect when once in position, but it does not travel well. Negretti's travels perfectly but acts *per saltum*, the column rising by jerks of 0.004 to 0.008 in. Rutherford's minimum when properly made works well.

M. WILD (T) There is no maximum which does not get out of order but Geissler's is the best. Metallic thermometers are pretty good if often cleaned. Rutherford's minimum.

M. MÖHL uses a maximum thermometer with two glass rods, one behind the other.

M. EBERMAYER had found it faulty; Greiner's was perfect.

M. BRUHN (T) No maximum could be permanently trusted; the minimum was alone reliable.

MR. SCOTT (T) Negretti's maximum; Casella's mercurial minimum very beautiful but not quite trustworthy.

M. BUYS BALLOT (T) They might be trusted.

MM. VON FREEDEN & BEHRENS (T) The proper slope for each of these instruments must be ascertained.

The error in Rutherford's from condensation at the top of the tube was pointed out, and M. EBERMAYER said it could be avoided by altering the entrance of the tube into the bulb.

The discussion was summarized, (1) that the readings of self-registering should be frequently compared with standard thermometers; (2) that Rutherford's minimum was satisfactory; (3) that no maximum could be recommended for general adoption; and (4) therefore it was very desirable to devise a trustworthy one.

(5) *What instruments should be employed for determining the intensity of Radiation, and in what way can the comparability of the results obtained be secured?*

[We divide this into two parts, Solar and Terrestrial Radiation. Ed.]

SOLAR RADIATION.

SR. F. DA SILVEIRA (W) The black bulb maximum in vacuo.

PROF. RAGONA (W) An instrument described by himself in 1862, at the Polytechnic Association at Turin—viz., a Negretti's maximum kept at a right angle to the sun, but a heliostat driven by clockwork.

MR. SYMONS (W) Small bulb mercurial maximum thermometers with the bulb and one inch of the stem coated with dull black, in a vacuum jacket, mounted on a post, so that the bulbs are freely exposed to the sun, are the most comparable instruments.

BORDEAUX MEETING (W) Melloni's pile must be the sole standard of reference, but recommended for ordinary use black bulb vacuum thermometer, and that an ordinary [bright bulb? Ed.] thermometer also in vacuo, should be placed by its side. If possible each should be compared with a Melloni's pile.

TERRESTRIAL RADIATION,

SR. F. DA SILVEIRA (W) Black bulb minimum in vacuo, in focus of parabolic mirror.

BORDEAUX MEETING (W) Vacuum thermometers cannot be used for terrestrial radiation, obscure heat does not easily pass through glass, therefore it is the jacket, not the bulb, which is cooled. Recommend Melloni's pile.

M. WILD (T) Mr. Symons should be requested to report upon the modes adopted in England.

M. JELINEK (T) English physicists might be asked to institute experiments, and report. He would do so with the apparatus at the Central Anstalt.

MR. SCOTT (T) The difficulty was that at present different instruments were not comparable.

No decision reported.

6. *What instruments are the best for determining Earth Temperatures? At what depths should the observations be taken in order to obtain that uniformity which is desirable?*

M. CARL FRITSCH (W) Lamont's apparatus the best; thinks thermometers of ordinary dimensions should be used, sunk to any required depth, that the lowest should be in the stratum of constant temperature, and the others gradually at less intervals till the surface is reached.

CAPT. HOFFMEYER (W) intends to try Regnault's new air thermometer, (silver capillary tubes.)

BORDEAUX MEETING (W) The question must be considered as a question of terrestrial physics as well as in its meteorological aspect. As regards the first, it is mainly a question of cost, but a depth of 100 or 150 feet is necessary, and Becquerel's electric thermometer should be used. For Climatology, the temperature of the surface of the soil, and of the roots of plants is required. Suggest that thermometers 3 feet long and upwards should have a spare bulbless tube attached, so as to facilitate corrections for expansion of the column.

M. WILD (T) The same course of action should be taken as for the previous one, viz., to request a report from an expert.

MR. BUCHAN (at the request of Mr. SCOTT), explained that the method adopted in Scotland since 1856, had been to place thermo-

meters at 3, 12, and 22 inches deep, but this had mainly been done in the interest of agriculture.

M. VON OETTINGEN (T) That in order to avoid complication due to variety of soil, all observations for meteorological purposes should be made in soil of the same character.

M. EBERMAYER (T) Lamont's method the best, and referred for details to his forthcoming work on the influences of woods on air and soil. (*Die physische Einwirkung des Waldes auf Luft und Boden.*)

M. BRUHNS (T) The electrical should be used as well as Lamont's.

M. NEUMAYER had investigated the question at Melbourne, and referred for description of his method to "*Discussion of Meteorological and Magnetical Observations made at the Flagstaff Observatory, Melbourne. Mannheim, 1867.*"

No decision was come to upon this question, nor does it seem to have been referred to anyone.

THE WINTER.

To the Editor of the Meteorological Magazine.

SIR,—At the end of last November (*see* p. 204 of your Magazine), I predicted that "the coming winter must be, on the whole, a mild or nearly a medium one," and that "the mean temperature of December to February, inclusive, would be in excess of, or about the average." I also said, "it seems almost certain that the mean temperature of February, 1873, will be below the Greenwich average of the last fifty years," and that "one of the intervals of sharp frost should occur in the early part of February." The winter has, on the whole, been mild. The mean temperature of December to February, inclusive, was $1^{\circ}0$ above the Greenwich average of the last fifty years, but almost as low as the average of the last 25 years, and the mean of February (1873), was $4^{\circ}7$ below the Greenwich average of the 50 year period. Sharp frost and snow occurred in the early part of February, and the minimum temperature in the south of England, was, according to Mr. Glaisher, as low as $19^{\circ}6$ in the first week of the month.

GEORGE D. BRUMHAM.

Barnsbury, March, 1873.

REVIEWS.

Ozone and Antozone, their History and Nature; when, where, why, how Ozone is observed in the Atmosphere? By CORNELIUS B. FOX, M.D. Edin., M.R.C.P. Lond., &c. 8vo, 301 pp., 31 Illustrations. Churchill.

DR. FOX dedicates this handsome volume to "the memory of the great and illustrious father of Ozonometry," Prof. Schönbein, and, on the whole, we think that had the Professor still been with us he would have highly appreciated the work. It is not perfect, but it is as nearly so as any one could have made it, and will, we think, at once secure for its author recognition as one of the foremost authorities on the subject. We are afraid to say how many "Ozone Committees" have

been appointed in this country alone, but we are sure of one point, namely, that Dr. Fox has done more to produce order out of chaos, and to substitute accuracy for uncertainty and fallacy than all the committees put together. It is quite beyond our scope to give even a *résumé* of this encyclopædic work, but we may briefly say that it fully answers each of the questions on its title, and brings together in one language and under one cover, a remarkable collection of what has been written on the subject both in the old and new worlds. We may here, *en passant*, refer Dr. Fox to the experiments with ozone tests in open and closed glass and metal tubes, and at different elevations above the earth's surface made by the Radcliffe Observer in 1867, and published in the "Oxford Observations," which seem to have escaped his vigilant search.

Dr. Fox, in addition to his wide acquaintance with the literature of his subject, has been an observer for some years, hence his opinion on the fourth head, "*How*" ozone is (and should be) observed, is of great value. In this chapter, however, he has stopped one step too soon. He has given us designs for aspirators, and he has told us where to get pure chemicals, and approximately pure paper, and how to prepare the tests, and then quietly writes—

"Where should ozone be observed? Everywhere."

We fear there is a great gulf between our author's instructions, as to the preparation of the tests, and the fulfilment of his wish, that ozone may be "everywhere," or even generally, observed. We cordially agree with nearly all Dr. Fox's views, and shall rejoice if really useful observations can be made by ordinary persons. Admitting all objections to Dr. Moffat's old tests, and to the mode of observing them, they had one great recommendation—they were made as nearly uniform as practicable, and we think that no wide-spread adoption of Dr. Fox's method can occur until he makes arrangements which shall place the preparation of the tests, and the construction of the aspirators, in the hands of some one responsible and competent person. Skill in observing, and in manipulative chemistry, though frequently, are by no means always, combined, and if extreme accuracy is within reach, the path thereto must lead through strict uniformity in the mode of preparation as well as observation.

Meteorological Report for the Year 1871. Edited by the REV. R. F. WHEELER, M.A., and the REV. R. E. HOOPPELL, L.L.D., F.R.A.S. [From *Nat. Hist. Trans. of Northumberland and Durham*, Vol. IV. 1872.] Newcastle. J. Bell, and Co.

WE have nothing but praise for this excellent paper, which maintains its position as unquestionably the best of the local reports, and reflects equal credit upon its editors and the observers, while the public spirit of the club in maintaining so efficiently a publication which, from the excessive amount of tabular matter must be very expensive, should not pass without due recognition. As a storehouse of facts, all most excellently arranged, it has no equal, and the Editorial notes are so

good as to make us regret that they are so brief. We have a suspicion that the Editors find the preparation and verification of all the returns makes such demands on their time that they are unable to find leisure for those generalisations which the scientific attainments and local knowledge of the Editors would render of great value. Should this be the case, we venture to suggest that it would be to the interest of Science, of the club, and of the Editors that some of the purely routine work should be taken off their shoulders.

METEOROLOGICAL OBSERVATIONS AT PATRAS.

To the Editor of the Meteorological Magazine.

SIR,—I am very glad to be able to send you once more some information as to the meteorology of Greece. I enclose tables of the rainfall, temperature, cloudiness, and earthquakes at Patras during the year 1872, upon which, as they will occupy considerable space in your pages, I will offer but few words by way of comment.

An unfortunate gap occurs in the table of minimum temperatures, for my minimum thermometer got broken, and it was not till the end of September that I procured a new one.

Rainfall.—This has been much below the average; every month excepting April, and perhaps also January and May, showing a greater or less deficiency. Since, however, the autumn rains of 1871 had been very heavy, there was no lack of water here last summer; but the autumn rains of 1872 have been so scanty that, unless the approaching spring proves much wetter than any I have yet seen, we have cause to fear a drought in the coming summer.

Temperature.—The year has been as remarkable for heat as for dryness. None of the months were at all colder than usual, while March, May, and September, were most unusually warm. Hot dry winds, charged with African sand, made March a most unpleasant month. In the middle of May came a spell of extraordinary and merciless heat; while September, instead of refreshing us after the heats of July and August, was, in reality, but little cooler than they, and to our feelings very much worse. October and November were also much above the average, and it was only the last few days of December that even pretended to be cold, and these, with maxima between 55° and 60° , and minima from 36° to 41° , with absolutely cloudless skies, and wind scarcely perceptible, made Christmas weather which you in England would have envied.

Clouds.—Observation of clouds is a source of much perplexity to me. I find it most difficult to apply rightly in this country the terms "cirrus," "cumulus," &c. Sometimes there may be seen at one view all varieties of cloud from cirrus to nimbus, each of the principal mountains in sight enjoying weather peculiar to itself. I have recorded every morning the general impression left upon me in the course of the preceding day, and from this record the subjoined table has been constructed.

Earthquakes.—These have been neither severe nor numerous this

[illegible]

Table of Rainfall for 1872.

| Day | Jan. | Feb. | March | April | May | June | July | Aug. | Sept. | Oct. | Nov. | Dec. |
|---------|------|------|-------|-------|-----|------|------|------|-------|------|------|------|
| 1..... | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. |
| 2..... | .. | .. | .. | .. | .. | ·05 | .. | .. | .. | ·10 | .. | .. |
| 3..... | .. | .. | .. | 1·08 | .. | .. | .. | .. | .. | .. | .. | .. |
| 4..... | .. | .. | .. | ·15 | .. | .. | .. | .. | .. | .. | ·06 | .. |
| 5..... | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | ·58 |
| 6..... | .. | .. | .. | ·10 | .. | .. | .. | .. | .. | .. | .. | .. |
| 7..... | .. | .. | .. | ·26 | .. | ·02 | .. | .. | .. | .. | .. | .. |
| 8..... | .. | .. | .. | ·06 | .. | .. | .. | .. | .. | .. | .. | ·04 |
| 9..... | 1·12 | .. | .. | ·06 | .. | .. | ·04 | .. | .. | .. | .. | .. |
| 10..... | 1·29 | ·03 | .. | ·47 | .. | .. | .. | .. | .. | .. | .. | ·05 |
| 11..... | ·07 | .. | .. | ·01 | .. | ·01 | .. | .. | .. | ·98 | ·35 | ·36 |
| 12..... | ·10 | .. | .. | .. | .. | .. | .. | .. | .. | .. | ·28 | .. |
| 13..... | .. | ·70 | ·21 | .. | ·20 | .. | .. | .. | .. | .. | ·03 | .. |
| 14..... | .. | .. | .. | ·03 | .. | .. | .. | .. | .. | .. | .. | ·46 |
| 15..... | .. | .. | .. | ·02 | .. | .. | .. | .. | .. | .. | ·79 | .. |
| 16..... | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | ·12 |
| 17..... | .. | ·18 | .. | .. | .. | .. | .. | .. | .. | ·02 | ·16 | .. |
| 18..... | .. | .. | .. | .. | .. | .. | .. | .. | .. | ·76 | .. | ·65 |
| 19..... | ·03 | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | ·57 |
| 20..... | .. | .. | ·10 | .. | .. | .. | .. | .. | .. | .. | .. | ·80 |
| 21..... | ·01 | .. | ·18 | .. | .. | .. | .. | .. | .. | .. | ·04 | .. |
| 22..... | .. | .. | .. | .. | .. | ·04 | .. | .. | .. | .. | .. | .. |
| 23..... | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. |
| 24..... | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. |
| 25..... | .. | .. | ·56 | .. | .. | .. | .. | .. | .. | ·45 | .. | .. |
| 26..... | .. | ·51 | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. |
| 27..... | .. | ·19 | ·14 | .. | ·07 | .. | .. | .. | .. | .. | .. | .. |
| 28..... | .. | ·01 | .. | .. | ·06 | .. | .. | .. | .. | .. | .. | .. |
| 29..... | ·14 | .. | .. | .. | .. | .. | .. | .. | .. | .. | ·04 | .. |
| 30..... | ·23 | .. | .. | .. | .. | .. | .. | .. | .. | ·35 | ·13 | .. |
| 31..... | .. | .. | .. | .. | ·18 | .. | .. | .. | .. | .. | .. | .. |
| | 2·99 | 1·62 | 1·19 | 2·24 | ·51 | ·12 | ·04 | .. | .. | 2·66 | 1·88 | 3·63 |

Total Rainfall of the year..... 16·88 inches.

| | | | | | | | | | | | | |
|---------------|---|---|---|----|---|---|---|---|---|---|---|---|
| Rainy days... | 8 | 6 | 5 | 10 | 4 | 4 | 1 | 0 | 0 | 6 | 9 | 9 |
|---------------|---|---|---|----|---|---|---|---|---|---|---|---|

Total Number of Rainy Days..... 62

Table of Earthquakes in Patras in 1872.

| | Jan. | Feb. | March | April | May | June | July | Aug. | Sept. | Oct. | Nov. | Dec. |
|------|-------|------|-------|-------|------|------|------|------|-------|------|------|------|
| 12 . | | 8 . | 3 . | | 25 . | 4 . | | | | | | 28 . |
| 13 . | | 19 . | 19 . | | | 11 . | | | | | | |
| 18 . | | | | | | 12 . | | | | | | |
| 21 . | | | | | | | | | | | | |
| 25 . | | | | | | | | | | | | |
| 31 . | | | | | | | | | | | | |

The figures represent the days of the month on which the earthquakes took place, and the size of the dots their severity.

Table of Cloud at Patras in 1872.

| Number of days in which there appeared | Jan. | Feb. | March | April | May | June | July | Aug. | Sept. | Oct. | Nov. | Dec. |
|---|------|------|-------|-------|-----|------|------|------|-------|------|------|------|
| Cloud obscuring the sky entirely, or nearly so, all day | 9 | 7 | 4 | 4 | 1 | .. | .. | .. | .. | 2 | 4 | 6 |
| Clouds of various density and extent scattered over the sky | 14 | 15 | 12 | 17 | 14 | 11 | 8 | 7 | 1 | 19 | 19 | 13 |
| No clouds at all, or but a few small ones on the mountains, or on the horizon | 8 | 7 | 15 | 9 | 16 | 19 | 23 | 24 | 29 | 10 | 7 | 12 |

THE SNOW IN FEBRUARY.

The following letters read in conjunction with those in our usual notes on pages 35 and 36, will place our readers in possession of the leading features of the remarkably heavy fall of the 2nd.

BROMLEY.—Snow fell here on an average six inches deep on 25th, but not a vestige remained on 26th.—*A. Rawson.*

SIR,—We had a heavy fall of snow here yesterday, February 2nd, all through Saturday night and Sunday morning. It was very stormy—roads blocked up so that the post-cart had to be left behind, and the bags brought forward on horseback. Wind east, but somewhat changeable. Thermometer dropping to 24° through the night, barometer 28·8., this morning it was 29·2, and still rising. Now, towards three o'clock it is close upon 29·4, thermometer at 28°. Have now hopes of getting our ice-house filled yet; we have had nothing like this snow-storm for years.

T. C. ELLIOT.

Melbury House Gardens, Dorchester, February 3, 1873.

DARTMOOR.—Heavy snow storm on the 1st and 2nd; no communication with railway, no post, locomotion impossible, the drifts being excessively deep. On 21st, heavy mist, which froze as it fell. Strange and beautiful phenomenon on 24th; snow all night, at 11 a.m. raining hard, freezing as it fell; at 6 p.m. all the snow, and portions of the ground where there was no snow, were coated over with continuous sheets of frozen rain, more than half-an-inch thick. Snow drifted in some places 12 feet deep; forked lightning on the 26th, and sheet lightning on the 27th, but no thunder.—*R. E. Power, M.D.*

SIR,—Enclosed is an extract from a letter from the Rev. J. B. Riky, the rector of Bagborough, a village $7\frac{1}{2}$ miles N.W. of Taunton, dated February 7th, describing the snow-storm of Sunday the 2nd. It is confirmed by my gardener at Halse, 5 miles to the S.W. of Bagborough, who says that in the open fields the snow lay 2 feet deep, and where it was drifted, 5 or 6 feet, and that the farmers had all their men employed on Sunday in digging out the lambs.—Yours faithfully.

R. C. A. PRIOR.

48, York-terrace, N. W., February 10, 1873.

"The snow which fell on the 2nd has drifted to such an extent about here that we have been unable to use our roads. Gradually they are

being dug out, but even now our Taunton road is quite impassable except on foot. I walked down it on Monday with three of my children, thinking they might live years before they might see such a sight again. It was truly grand, and delighted them beyond measure. We walked on the snow quite level with our high hedges. The mail-cart is still unable to pass."

SIR,—I sent you, a few days ago, some account of the unusually heavy snowstorm west of Taunton on the 2nd of February. My gardener writes yesterday from Halse, seven miles west from it :—"We did not get our letters all last week till 11 o'clock instead of half-past seven. The snow was so deep that the mail-carts could not travel. It will take a week more now before it is all gone."—Yours obediently,

February 13, 1873.

R. C. A. PRIOR.

SIR,—My gardener writes from Halse—"We have again had a heavy fall of snow. It began on Sunday and continued till Tuesday morning, and lay two feet deep." I enclose part of a letter from another friend residing at Milverton, dated Feb. 19th, respecting the storm of the 2nd.—Yours, &c.

R. C. A. PRIOR.

48, York Terrace, N. W., Feb. 27, 1873.

"We have had here a heavier fall of snow than has been known in the memory of man, and to give you some idea of it, I may mention the snow drifts are so deep in some places, that I had the greatest difficulty yesterday (now sixteen days since its fall), in cutting my way through between Nynhead and Langford, and for days the roads, in consequence of the drifts, were quite impassable."

CLONMEL.—On 1st. a violent snow storm, commencing at 3 p.m., and continuing until 9 a.m. on 2nd. Snow about 16 inches deep, but drifted to the height of 3 and 5 feet in the streets, and in parts of the open country to 10 or 12 feet. Nothing like it here since 27th January, 1855. Wind due east.—*J. H. Grubb.*

INTENSE FROST ON FEBRUARY 24TH.

To the Editor of the Meteorological Magazine.

SIR,—I forward particulars of a noteworthy frost, as registered here :—

Temperature in the Shade.

| | | | Min. | | | Max. |
|-----------|-----|-----|------|-----|-----|------|
| Feb. 23rd | ... | ... | 18·2 | ... | ... | 33·1 |
| „ 24th | ... | ... | 3·6 | ... | ... | 34·9 |
| „ 25th | ... | ... | 9·7 | ... | ... | 42·5 |

Four inches of snow fell on the 23rd, and one inch on the 24th. Rain, to the amount of 0·32 in. was registered for the 25th.

The minimum of the 25th was in reality a second minimum for the 24th, as the temperature indicated was observed as occurring at 8 p.m. on the latter day, and the true minimum for the 25th would not be lower (probably) than 15·0°.

My thermometers are suspended on a modified Pastorelli stand, four feet above the ground.

T. B. ARMITSTEAD, B.A., F.M.S.

The Parsonage, Garstang, Lancashire.

BOOKS RECEIVED.

- Fourth Report of the Underground Temperature Committee.* [From the *Brit. Ass. Report.*] 8vo.
- On the connexion between Explosions in Collieries and Weather.* By R. H. SCOTT, M.A., F.R.S., and W. GALLOWAY. [From *Proc. Roy. Soc.*] 8vo.
- On the General Circulation and Distribution of the Atmosphere.* By Prof. J. D. EVERETT. [From the *Phil. Mag.*] 8vo.
- Meteorological Tables, &c., Truro, 1871.* By C. BARHAM, M.D. [From *Journal of Royal Institution of Cornwall.*] 8vo.
- Climate of Sidmouth, with results of Met. Obs., 1865-1870.* By J. I. MACKENZIE, M.B. Cantab. [Reprint from *British Medical Journal.*] 8vo. Richards, Great Queen Street, London.
- Meteorological Observations, Toronto, January to June, 1872.* By G. T. KINGSTON, M.A., Director.

HIGH BAROMETER ON FEBRUARY 18th.

We seem to be passing through a period when extremes of all kinds are unusually frequent. We had last year an amount of rain in many cases unprecedented. On January 19th and 20th the barometer was lower than it had been, with one exception, for a dozen or more years, and now within a month we have to record 30·826 in., against 28·165, or taking the average of all England, we have on the morning of January 20th about 28·4, and on that of February 18th 30·75.

As in the case of the January depression, so in the present case of unusual elevation, it was a movement extending over a large part of Europe, and therefore unaccompanied by strong winds, or what may be called local features. It is true the pressure did not quite reach the same extreme point at all places, but the differences were not large. It appears from the data we have received, that in the early morning the highest point was in the neighbourhood of Huntingdonshire, and that it passed down south-eastwards towards noon, giving the extreme readings at London at Tunbridge Wells of 30·826 and 30·825 respectively.

We add a few of the highest readings on February 18th :—

| Div. | County. | Station. | Hour. | Sea Level Pressure. |
|------|-----------------|---------------------------|-----------|---------------------|
| I. | Middlesex | Camden Square* | 11.0 a.m. | 30·826 |
| II. | Kent..... | Royal Observatory | 9.0 " | 30·803 |
| " | " | Parkside, Beckenham ... | 9.0 " | 30·791 |
| " | Sussex | Worthing | 9.0 " | 30·773 |
| " | " | Brighton | 9.0 " | 30·801 |
| " | " | Crowboro' Beacon Obs... | 8.0 " | 30·825 |
| " | Hampshire | Strathfield Turgiss | 9.0 " | 30·788 |
| III. | Cambridge | Merton Villa, Cambridge | 9.0 " | 30·790 |
| V. | Somerset | Paragon, Bath | 9.0 " | 30·771 |

As it is convenient to many to have lists of extremes available for comparison, we have compiled the following tables. Not having the air temperature at Greenwich at the time of all the maxima, we have applied as a constant correction that due (for 159 feet) to 30·5 in. at an air temperature of 40°.

* At 9 a.m., 30·790.

BAROMETRIC MAXIMA.
Royal Observatory, Greenwich.

| Year | Date. | Hour. | Pressure at 159 ft. | Pressure at sea level. | Year | Date. | Hour. | Pressure at 159 ft. | Pressure at sea level. |
|------|----------|----------|------------------------|------------------------------|------|---------|------------|------------------------|------------------------------|
| 1840 | Dec. 27 | 8.0 a.m. | 30.558 | 30.738 | 1856 | Jan. 13 | 10.0 a.m. | 30.550 | 30.730 |
| 1841 | Mar. 11 | 10.0 " | .388 | .568 | 1857 | Nov. 12 | 9.0 " | .609 | .789 |
| 1842 | Nov. 18 | 10.0 " | .470 | .650 | 1858 | Jan. 17 | 10.30 " | .557 | .737 |
| 1843 | Jan. 19 | 10.0 " | .437 | .617 | 1859 | Jan. 9 | 10.50 p.m. | .640 | .820 |
| " | Dec. 14 | 10.0 " | .437 | .617 | 1860 | Feb. 14 | 9.45 a.m. | .434 | .614 |
| 1844 | Mar. 29 | 10.0 " | .418 | .598 | 1861 | Feb. 2 | noon. | .544 | .724 |
| 1845 | Mar. 22 | 2.0 " | .376 | .556 | 1862 | Feb. 8 | 9.0 p.m. | .495 | .675 |
| 1846 | Jan. 9 | 10.0 " | .543 | .723 | 1863 | Feb. 13 | 11.30 a.m. | .523 | .703 |
| 1847 | March 4 | 0.0 " | .404 | .584 | 1864 | Nov. 6 | 7.15 p.m. | .496 | .676 |
| 1848 | Jan. 12 | 0.0 " | .374 | .554 | 1865 | Dec. 15 | 10.30 " | .610 | .790 |
| 1849 | Feb. 11 | 9.0 p.m. | .715 | .895 | 1866 | Jan. 25 | 10.30 a.m. | .506 | .686 |
| 1850 | Dec. 23 | noon. | .482 | .662 | 1867 | March 2 | 11.50 " | .618 | .798 |
| 1851 | Sept. 16 | 9.0 p.m. | .466 | .646 | 1868 | Nov. 13 | 10.0 " | .471 | .651 |
| 1852 | March 6 | 9.0 " | .655 | .835 | 1869 | Dec. 5 | 11.25 p.m. | .410 | .590 |
| 1853 | Nov. 9 | noon. | .414 | .594 | 1870 | Jan. 18 | 11.0 a.m. | .466 | .646 |
| 1854 | March 4 | 9.0 p.m. | .669 | .849 | " | Dec. 2 | 10.15 " | 30.466 | 30.646 |
| 1855 | Jan. 12 | 9.0 p.m. | 30.483 | 30.663 | | | | | |

Camden Square, Middlesex.

| Year. | Date. | Hour. | Pressure at sea level. | Year. | Date. | Hour. | Pressure at sea level. |
|---------|---------|------------|------------------------------|---------|---------|-----------|------------------------------|
| 1858... | Jan. 17 | 9.0 a.m. | 30.699 | 1866... | Jan. 25 | 9.0 a.m. | 30.663 |
| 1859... | Jan. 9 | 11.40 p.m. | .830 | 1867... | March 2 | 9.0 " | .788 |
| 1860... | Feb. 14 | 9.0 a.m. | .624 | 1868... | Nov. 13 | 9.0 " | .653 |
| 1861... | Feb. 2 | 0.30 p.m. | .729 | 1869... | Dec. 6 | 9.0 " | .589 |
| 1862... | Feb. 8 | 8.30 " | .690 | 1870... | Dec. 1 | 9.0 p.m. | .628 |
| 1863... | Feb. 13 | 9.0 " | .693 | 1871... | Dec. 12 | 9.0 a.m. | .520 |
| 1864... | Nov. 6 | 9.0 " | .690 | 1872... | April 6 | 9.0 p.m. | .473 |
| 1865... | Dec. 15 | 9.0 " | 30.782 | 1873... | Feb. 18 | 11.0 a.m. | 30.826 |

G. J. SYMONS.

Beckenham, Kent.

| | | | | | | | |
|---------|---------|-----|--------|---------|---------|-----|--------|
| 1867... | March 2 | ... | 30.759 | 1871... | Dec. 8 | ... | 30.515 |
| 1868... | Nov. 13 | ... | .621 | 1872... | April 7 | ... | .519 |
| 1869... | Dec. 6 | ... | .578 | 1873... | Feb. 18 | ... | 30.791 |
| 1870... | Dec. 2 | ... | 30.625 | | | | |

C. O. F. CATOR.

Uckfield, Sussex.

| | | | | | | | |
|---------|---------|-----|--------|---------|---------|----------|--------|
| 1854... | Mar. 5 | ... | 30.579 | 1863... | Feb. 13 | ... | 30.725 |
| 1856... | Jan. 13 | ... | .721 | 1865... | Dec. 16 | ... | .725 |
| 1857... | Nov. 12 | ... | .770 | 1867... | March 2 | ... | .757 |
| 1858... | Jan. 17 | ... | .726 | 1873... | Feb. 18 | 8.0 a.m. | 30.825 |
| 1859... | Jan. 10 | ... | .824 | | | | |

C. L. PRINCE.

Paragon, Bath, Somerset.

| | | | | | | | |
|---------|---------|-----|--------|---------|---------|----------|--------|
| 1852... | March 6 | ... | 30.787 | 1861... | Feb. 2 | ... | 30.792 |
| 1859... | Jan. 3 | ... | 30.806 | 1873... | Feb. 18 | 9.0 a.m. | 30.771 |

C. S. BARTER.

FEBRUARY, 1873.

| Div. | STATIONS. [The Roman numerals denote the division of the Annual Tables to which each station belongs.] | RAINFALL. | | | | | | TEMPERATURE. | | | | No. of Nights below 32° |
|----------|---|-------------|--------------------------------|----------------------------|-------|---------------------------------|------|--------------|------|-------|----------|-------------------------|
| | | Total Fall. | Difference from average 1860-5 | Greatest Fall in 24 hours. | | Days on which '01 or more fell. | Max. | | Min. | | | |
| | | | | Dpth | Date. | | Deg. | Date. | Deg. | Date. | | |
| | | | | | | | | | | | | |
| | | inches | inches. | in. | | | | | | | In shade | On grass. |
| I. | Camden Town | 1·96 | +·74 | ·61 | 2 | 13 | 50·1 | 26 | 25·8 | 25 | 19 | 22 |
| II. | Maidstone (Linton Park)..... | 2·24 | +·73 | ·49 | 25 | 13 | 51·0 | 14* | 25·0 | 2, 25 | 24 | ... |
| III. | Selborne (The Wakes)..... | 2·60 | +·89 | ·92 | 25 | 12 | 48·2 | 26 | 23·0 | 25 | 23 | 24 |
| IV. | Hitchen | 1·64 | +·38 | ·28 | 25 | 15 | 47·0 | 26 | 23·0 | 22 | 25 | ... |
| V. | Banbury | 1·50 | +·07 | ·29 | 26 | 15 | 48·0 | 26 | 24·0 | 2 | 24 | ... |
| VI. | Bury St. Edmunds (Culford)..... | 1·88 | +·46 | ·50 | 3 | 11 | 50·0 | 26 | 21·0 | 22 | 23 | 26 |
| VII. | Bridport | 3·17 | +1·11 | ·77 | 24 | 11 | 51·0 | 26 | 26·0 | 25 | 15 | ... |
| VIII. | Barnstaple..... | 2·29 | +·21 | ·78 | 24 | 9 | 50·5 | 26 | 29·5 | 24 | ... | ... |
| IX. | Bodmin | 4·95 | +2·16 | 1·50 | 1 | 15 | 53·0 | 25 | 28·0 | 11 | 9 | 13 |
| X. | Cirencester | 1·63 | +·02 | ·34 | 23 | 11 | ... | ... | ... | ... | ... | ... |
| XI. | Shifnal (Haughton Hall) | ·94 | +·05 | ·25 | 2 | 11 | 47·0 | 26 | 20·0 | 23 | 22 | ... |
| XII. | Tenbury (Orleton) | 1·02 | +·55 | ·24 | 24 | 15 | 51·8 | 26 | 24·8 | 25 | 18 | 19 |
| XIII. | Leicester (Wigston) | 1·74 | +·40 | ·44 | 25 | 9 | 50·0 | 26 | 20·0 | 22 | 20 | ... |
| XIV. | Boston | 1·68 | +·47 | ·42 | 3 | 14 | 49·0 | 26 | 23·0 | 26 | 19 | ... |
| XV. | Grimsby (Killingholme) | 1·68 | ... | ·42 | 3 | 18 | 49·0 | 26 | 19·0 | 25 | 9 | ... |
| XVI. | Derby..... | ·68 | —·80 | ·15 | 24 | 11 | 50·0 | 26 | 22·0 | 23 | 18 | ... |
| XVII. | Manchester | ·67 | —1·28 | ·16 | 26 | 11 | ... | ... | ... | ... | ... | ... |
| XVIII. | York | 1·28 | +·10 | ·32 | 25 | 13 | 45·0 | 16 | 10·0 | 25 | 18 | ... |
| XIX. | Skipton (Arncliffe) | 1·27 | +2·40 | ·52 | 26 | 9 | ... | ... | ... | ... | ... | ... |
| XX. | North Shields | 1·91 | +·38 | ·43 | 3 | 16 | 45·9 | 20 | 17·7 | 24 | 12 | 16 |
| XXI. | Borrowdale (Seathwaite)..... | 3·05 | +8·33 | 1·61 | 25 | 4 | ... | ... | ... | ... | ... | ... |
| XXII. | Cardiff (Ely) | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... |
| XXIII. | Haverfordwest | 3·76 | +·90 | ·96 | 28 | 10 | 50·0 | 22§ | 27·0 | 12 | 16 | 21 |
| XXIV. | Rhayader (Cefnfaes)..... | 2·26 | —·72 | ·70 | 25 | 5 | 50·0 | ... | 21·0 | ... | ... | ... |
| XXV. | Llandudno | 1·23 | —·12 | ·25 | 25 | 11 | 50·5 | 20 | 25·6 | 25 | 9 | ... |
| XXVI. | Dumfries | 1·07 | +1·48 | ·92 | 25 | 2 | 50·0 | 20 | 15·5 | 24 | 15 | 22 |
| XXVII. | Hawick (Silverbut Hall)..... | 1·18 | ... | ·51 | 26 | 10 | ... | ... | ... | ... | ... | ... |
| XXVIII. | Kilmarnock (Annanhill)..... | ·62 | ... | ·27 | 25 | 7 | 48·0 | 14 | 18·2 | 4 | 24 | ... |
| XXIX. | Castle Toward | 1·77 | +1·97 | 1·05 | 26 | 6 | 50·0 | 20 | 19·0 | 24 | 16 | ... |
| XXX. | Leven (Nookton) | 1·13 | —·57 | ·52 | 25 | 11 | 51·0 | 14 | 19·0 | 24 | 20 | 27 |
| XXXI. | Stirling (Deanston) | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... |
| XXXII. | Logierait | ·75 | ... | ·43 | 25 | 5 | 51·0 | 18+ | 11·0 | 24 | 19 | ... |
| XXXIII. | Braemar | ·87 | +1·11 | ·25 | 2 | 6 | 47·8 | 20 | 8·0 | 8 | 18 | 28 |
| XXXIV. | Aberdeen | 1·72 | ... | ·28 | 2 | 20 | 47·2 | 21 | 12·7 | 25 | 20 | 21 |
| XXXV. | Inverness (Culloden) | ·82 | +1·06 | ·36 | 6 | 9 | 46·1 | 19 | 22·0 | 25 | 11 | 21 |
| XXXVI. | Portree | 2·05 | +8·18 | ·38 | 26 | 18 | ... | ... | ... | ... | ... | ... |
| XXXVII. | Loch Broom | 2·36 | ... | ·39 | 4 | 15 | ... | ... | ... | ... | ... | ... |
| XXXVIII. | Helmsdale | 1·54 | ... | ·37 | 22 | 14 | ... | ... | ... | ... | ... | ... |
| XXXIX. | Sandwick | 1·54 | —·94 | ·34 | 23 | 17 | 48·1 | 19 | 17·3 | 25 | 12 | 19 |
| XL. | Caherciveen Darrynane Abbey | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... |
| XLI. | Cork | 1·46 | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... |
| XLII. | Waterford | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... |
| XLIII. | Killaloe | 2·01 | —·90 | ·79 | 28 | 8 | 50·0 | 25 | 21·0 | 4 | 12 | 16 |
| XLIV. | Portarlington | ·49 | +1·54 | ·09 | 25 | 14 | 49·0 | 20 | 21·0 | 2 | 18 | ... |
| XLV. | Monkstown | ·75 | —·89 | ·22 | 28 | 8 | 48·0 | 17 | 21·0 | 3 | 12 | ... |
| XLVI. | Galway | 1·51 | ... | ·53 | 28 | 12 | 51·0 | 21‡ | 22·0 | 4 | 15 | ... |
| XLVII. | Bunninadden (Doo Castle) | 1·02 | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... |
| XLVIII. | Waringstown | ·74 | ... | ·23 | 25 | 8 | 51·0 | 20 | 12·0 | 23 | 22 | 23 |
| XLIX. | Edenfell (Omagh)..... | ·77 | ... | ·26 | 25 | 10 | 47·0 | 20 | 12·0 | 23 | 17 | ... |

*And 15. †And 20. ‡And 26. §And 25. ||And 20, 24 & 27.

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

METEOROLOGICAL NOTES ON FEBRUARY.

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 PARK.—A very dull month, first and last weeks wintry, the ground being covered with snow; frost never severe, though frequent, winds mostly N. and N.E., but often changeable, never high except on 25th. The most remarkable feature being the almost total absence of sunshine during the whole of the month.

SELBORNE.—Prevailing winds first three weeks N.E., the last week variable; altogether the coldest February but one in the last thirteen years. A foggy, comfortless, unhealthy month, and very hindering to farm and garden operations. Fog every day from 14th to 25th; very thick on 20th; faint aurora on 23rd. Ther. rose from 23° to 44° on 25th, all the S melted by the evening; aurora on 26th, brighter than that on the 23rd.

HITCHIN.—On the 2nd the heaviest S for 25 years.

CULFORD.—A month of very wintry weather; frost on the grass on every morning excepting those of the 25th and 26th. The mean temp. of the month below that of the preceding January 34°·4 to 40°·4. S on 9 days, Polar winds on 6 days, and equatorial winds on 22 days.

BRIDPORT.—Heavy S on 1st and 2nd; S in main road 10ft. to 15ft. deep. The month has been remarkable for the prevalence of northerly winds and high bar.

BODMIN.—S and R, with strong S.E. winds on 1st and 2nd. Temp. 4°·4 below the average; rainfall considerably above it.

HAUGHTON HALL.—The driest month since November, 1871, and the coldest February since 1865, in both of which years the temp. exceeded 32°·0 only on six nights, the average of 1865 being 30°·7, that of 1873 31°·0. Great fluctuation in the bar. A severe day on the 2nd; S, with strong easterly wind, forming drifts, which lasted till the 23rd, during which time the wind came from W. and N.W. The night of the 23rd the coldest this winter, ther. going down to 20°·0. A wonderfully bright meteor in N.N.W., 10 p.m., on 3rd. The ground, previously so saturated, became dry enough by the 15th for the farmers to plough.

ORLETON.—A very cloudy, gloomy, and cold month, but generally dry; temp. nearly 6° below the average; frequent light falls of S; about 3 in. deep on the 25th, and much drifted on the 2nd and 3rd; bar. very high on the 18th, and low on the 26th. L in the S.S.W. after dark on the 27th, with clear sky and frost; the wind frequently very rough.

WIGSTON.—A wintry, seasonable month, the mean temp. has been 8° below that of February, 1872, which has proved beneficial in checking vegetation. Agricultural work very backward.

BOSTON.—Temp. 5° below the average of previous 8 years; the period from 23rd to 26th one of great atmospheric disturbance, the temp. ranging 26°, the mean on the 26th being 49°, min. on 25th and 26th being 23°. The air was very dry.

KILLINGHOLME.—2nd and 3rd cold and unpleasant; mid-day temp. 31°. The greater part of month cold and ungenial; the third week had some very pleasant days; the frosts have thoroughly pulverised the ground, and been very beneficial both in that way and in retarding the blossoms of the wall-fruit trees.

DERBY.—A most welcome and necessary month, as farming operations, so long delayed, have now had scarcely a day's interruption.

YORK.—S on 3rd, 11th, 23rd, 24th, 25th, and 27th.

N. SHIELDS.—Lunar halo on 13th; S on several days.

SEATHWAITE.—Remarkably dry month.

WALES.

HAVERFORDWEST.—1st February severe gale from the east, after which a blinding snow set in, with the temp. as low as 27°. On Sunday morning the drifts were of great depth, in some places varying from 5 to 20 feet, completely blocking up the roads, while, in other parts, they were quite clear and dry with hard frosts;

and not a particle remained in the gauge ; from measuring the S in several places, and considering the extent of the drifts I estimated it at '90 in. at least. There was another heavy fall on 23rd and 24th, of which a large quantity was lost by being blown over the gauge ; '12 in. and '40 in. was the quantity melted in the gauges ; a sudden and rapid thaw then succeeded the S, frost again returned and was followed by heavy rain from the S.E., and '96 of R fell on the last day. Bar. 30'69 on 18th, and 28'78 on 26th. Sharp frosts on 16 nights, with north-easterly winds ; the month was cold and wintry throughout.

CEFNFAES.—The month has been cold, much S ; wind generally N.E. or S.E.

LLANDUDNO.—S on the hills, but a dry, seasonable month on the whole.

SCOTLAND.

DUMFRIES.—Frost was prevalent for the first half of the month, a few mild days followed, then frost returned in the last week of the month, with S on 23rd, 25th, and 27th ; the temp. on the morning of the 24th was at 15°·5, the lowest since December, 1870. The fall of rain was greatly below the average, and the temp. was also far below that of the corresponding month of last year.

HAWICK.—A frosty month, with frequent falls of S.

KILMARNOCK.—Mean temp. 5° below that of January, frost lasted nearly the whole month. Mean horizontal movement of air, 8 miles per hour. Stock healthy. Much ground ploughed, and if the weather keeps fine, sowing will be general in March ; very little wheat was sown last autumn owing to bad weather. Death-rate in Kilmarnock nearly twice that in January—31 per 1000 against 19—the excess mainly arising from consumption and bronchitis.

CASTLE TOWARD.—A dull, overcast, sunless month, with 24 frosty nights, and temp. as low as 19°·0 ; wind varying from N.E. to N.W. On 25th heavy fall of S filled our ice-house ; on the 4th and 5th ice in good order. Cattle healthy, vegetation beginning to show itself.

LOGIERAIT.—Much frost, with an interval of unusually fine weather between 15th and 20th.

ABERDEEN.—Mean bar. 0·253 in. above the average of 16 years ; mean temp. 35°·1 or 2°·7 below the average, and only twice during the 16 years was the mean temp. lower than in this month ; lowest mean temp. on grass 23°·6 ; min. of month, 12°·7 in air and 2°·4 on grass on 25th. A cold, dry, and rather fine month, notwithstanding two rather sharp snow storms, one at the beginning and the other at the end of the month ; frequent auroræ ; 18th, temp. in sun 91°·7.

PORTREE.—A very cold month, with much more frost and S than usual ; frost very severe on 24th, milk frozen with ice one-eighth of an inch thick at 9 a.m. ; much less rain than usual in February.

LOCHBROOM.—This has been on the whole a very severe, frosty month, and one of the heaviest snow storms that we have had for years began on the 22nd, and continued a whole week, accompanied with intense frost.

SANDWICK.—February has been 1°·7 colder than the mean of the previous 45 years, and drier than the mean of 32 years. Frost and snow from 22nd till the 1st of March. Auroræ on six nights. Gales of 40 miles an hour on 1st and 11th from 9 till 11 a.m., and from 5 p.m. on 17th to 1 a.m. on 18th ; gale 50 miles an hour from 4 p.m. on 21st, to 2 a.m. on 22nd.

IRELAND.

MONKSTOWN.—A very cold, dry February. Very hard frost on 3rd ; temp. 21°·0.

DOO CASTLE.—Remarkably free from rain ; fine month, resembling advanced spring weather. A few days of severe frost towards the beginning.

WARINGSTOWN.—Very fine and favorable to farm labour ; a great quantity of wheat sown, and the land thoroughly dried in consequence of the first week breaking up without rain.

OMAGH.—Min. temp. 12° on night of 23rd, the lowest since January, 1867, but the month, though cold, has been the finest February for many years, and the arrears in tillage operations, caused by the wet autumn, have almost been made up.

[We regret that the pressure on our space compels us to defer till our next, several important letters.—ED.]